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JOURNAL OF THE HISTORY OF MEDICINE AND ALLIED SCIENCES

Editorial Note

During the first year that the Journal has been issued under the direction of the new Department of the History of Medicine at Yale, attention has been given to certain criticisms which we have had from our more interested subscribers, and in this number we attempt to embody some of the many constructive suggestions which have been received. The general policies of the Journal remain unchanged, save that the Board is attempting to secure a greater variety of papers, both of general and scholarly interest, and we are also hoping to strengthen the Book Review section and that of Notes and Queries; in the case of the latter we hope to be able to give wider coverage to events of international interest to medical historians. The Editor has also decided to include a new section in Notes and Queries on rare and unusual books and would welcome contributions from our readers.

The cover of the Journal has been redesigned by Mr. Carl Purington Rollins, Printer Emeritus to Yale University, in response to requests that we place the Table of Contents on the front cover. There have also been a few minor changes in type design, such as running footnotes the full length of the page—this for reasons of economy.

In response to student interest a group of student editors has been appointed from the Yale School of Medicine to assist in proofreading and other editorial tasks. Their names are listed with the Editorial Board.

Finally, to enhance foreign distribution of the Journal, the new firm of London medical publishers, Lloyd-Luke (Medical Books) Ltd., has been made sole distributor of the Journal abroad, i.e., in all countries of the world other than the United States and Canada. All foreign subscriptions and renewals, therefore, should in the future be arranged through Messrs. Lloyd-Luke (49 Newman Street, London W. 1) and they will send out the renewal notices for 1953-54.

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JANUARY 1953

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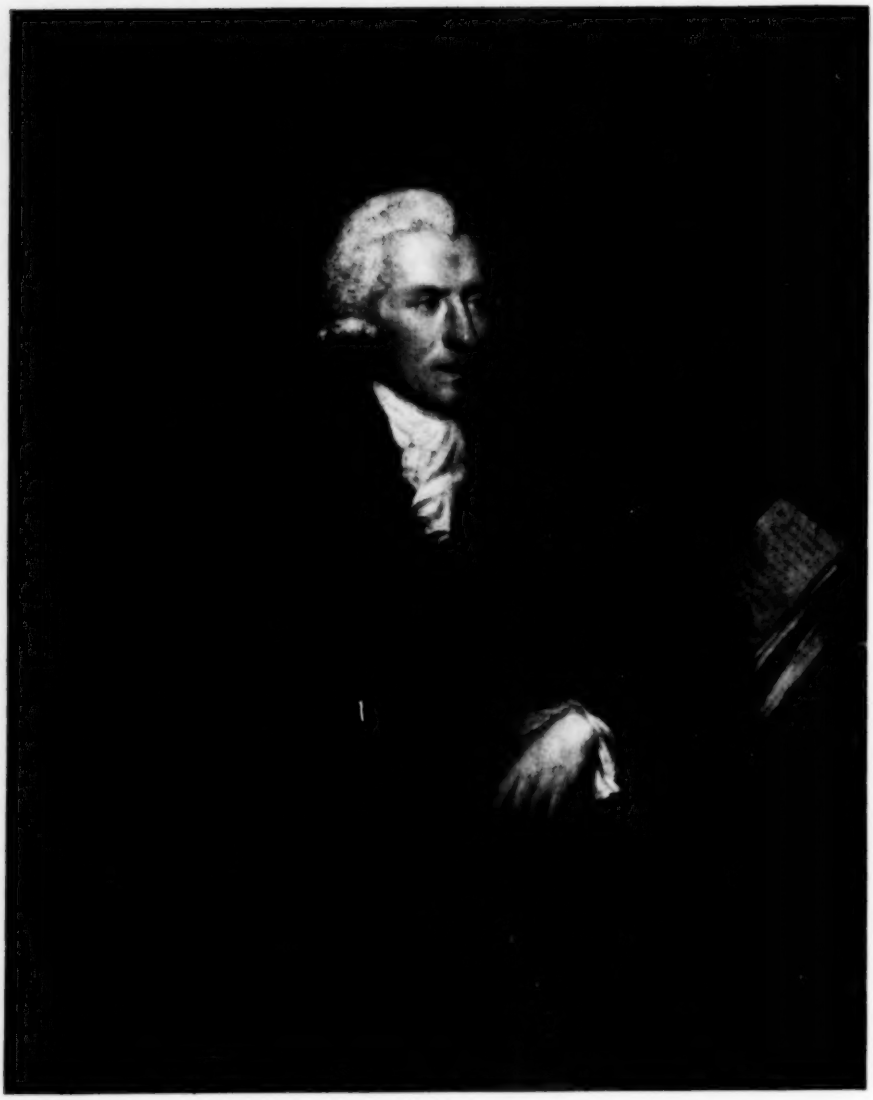

WILLIAM WITHERING, M.D., F.R.S.
Portrait by C. F. von Breda, 1792
(Stockholm National Gallery)

The Place of William Withering in Scientific Medicine*

JOHN F. FULTON

I. Nonconformity in the Midlands

WILLIAM WITHERING, the discoverer of the therapeutic virtues of digitalis, was born on 17 March 1741 at Wellington in Shropshire, England, the son of a successful practitioner. His formative years coincided with the great revival of learning which took place in England during the second half of the eighteenth century—a revival which occurred largely in the Midlands rather than in the academic centers of Britain. The parable of the seed and the soil can very appropriately be applied to Withering, for there are few more striking examples of how seed of great potentialities was nourished by the rich soil in which it was cast.

In the wake of the Puritan revolt in the seventeenth century, which led to the beheading of Charles I, came reformers such as John Milton and Samuel Hartlib who were to liberalize educational procedures and practices, both in the schools and in the universities of England. Further progress was made in this direction during the Commonwealth and the Protectorate. It has been said that "during the Commonwealth the door leading into the world of knowledge, of increased capacity, and of fuller life, was slowly opening to admit men who stood expectant without. But just as they were on the threshold, the door was shut—shut by the Restoration, and the way barred by the Clarendon Code."[1] Clarendon's conformist legislation, often referred to as the Test Acts, was made into law in 1662; it demanded strict adherence to the Prayer Book and the Thirty-nine Articles on the part of all those who held public office or who taught in the universities; it was this oppressive denial of freedom of thought which prompted the foundation of

* The Fifth Annual D. J. Davis Lecture on Medical History delivered on 28 April 1948 at the University of Illinois College of Medicine, Chicago, Illinois. For over two years the manuscript rested in the offices of the American Medical Association for publication in the *Bulletin of the Society of Medical History of Chicago*. With the fall of Dr. Fishbein from grace the *Bulletin* fell too. The Editors of this *Journal* considered the essay an appropriate accompaniment to Dr. O'Malley's translation of Withering's medical thesis which follows.

1 Parker, I. *Dissenting academies in England*. Cambridge, University Press, 1914. 168 pp. [p. 43].

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the first dissenting churches and academies in Britain. Small in number at first, and persecuted, they nevertheless flourished in centers such as Manchester, Liverpool, Warrington, and later at Birmingham. A vigorous intellectual life developed around these nonconformists and it was they who, on emancipating themselves from the spiritual suffocation of the Clarendon Code, fostered the arts and letters at a time when they were languishing in the universities and who were thus largely responsible for such progress as was made in England during the next century in science, literature, and the arts.

The atmosphere of universal curiosity, fostered by these free-thinking dissenters, spread outside of their academies, and in various nonconformist centers groups of men gathered together for discussion and scientific exchange. In 1766 such a group, known as the Lunar Society, became formally established in the Midland community of Birmingham. It flourished for about forty years and among its members were men such as Erasmus Darwin, William Small, James Watt, John Baskerville, Matthew Boulton, Joseph Priestley, and William Withering. The group seemed not to have numbered more than eight or ten at any one time and they met at one another's houses each month for dinner on the Monday nearest the full moon—in order, as Dr. Priestley recorded "to have the benefit of its light in returning home"—hence the name "Lunar." Members were invited to a two o'clock dinner and did not disperse until eight, during which interval there was spirited discussion of topics of general interest. Priestley writes: "The members have nothing to do with the *religious* or *political* principles of each other; we were united by a common love of *science*, which we thought sufficient to bring together persons of all distinctions—Christians, Jews, Mahometans, and Heathens, Monarchists and Republicans."[2]

Each member was permitted to bring one friend, with the result that many distinguished guests were from time to time present at their monthly feasts, among them Josiah Wedgwood, Sir William Herschel, the most eminent astronomer of the century, Jean André de Luc, the Swiss natural philosopher and geologist, and many others. Benjamin Franklin was a frequent visitor at the meetings of a similar group in London which flourished under the energetic direction of Sir Joseph Banks and his scholarly Swedish

2 Bolton, H. C. *The Lunar Society of Birmingham*. Privately printed for the Transactions of the Archaeological Section of the Birmingham and Midland Institute, 1890. 16 pp. [p. 1.]

librarian, Dr. Daniel Solander, Captain Cook, Sir Charles Blagden, etc. Thomas Beddoes and Humphry Davy led the social intellectual circle at Bristol, John Aiken and others at Warrington, and so it went. But the Lunar Society at Birmingham won the reputation of being the most distinguished of all these assemblages and something of the flavor of their lively intercourse and discussions can be gleaned from a few of the letters which passed between the members. On an occasion in 1778 when Erasmus Darwin was prevented by the demands of his busy practice from attending the monthly meeting, he sent this note to Matthew Boulton, the host of the month:

> Dear Boulton—I am sorry the infernal divinities who visit mankind with diseases, and are therefore at perpetual war with doctors, should have prevented my seeing all your great men at Soho today. Lord! what inventions, what wit, what rhetoric, metaphysical, mechanical, and pyrotechnical, will be on the wing, bandied like a shuttlecock from one to another of your troup of philosophers, while poor I, I by myself, I, imprison'd in a post-chaise, am joggl'd, and jostl'd, and bump'd, and bruised along the king's highroad to make war upon a stomach-ache or a fever.[3]

The calls to the meetings were in the nature of friendly reminders from the host and usually included a hint as to the nature of the intellectual feast in store. Thus, on 3 January 1781, James Watt wrote to Darwin:

> I beg that you would impress on your memory the idea that you promised to dine with sundry men of learning at my house on Monday next, and that you will realize the idea. For your encouragement there is a new book to cut up, and it is to be determined whether or not heat is a compound of phlogiston and empyreal air, and whether a mirror can reflect the heat of fire. I give you a friendly warning that you may be found wanting whichever opinion you adopt in the latter question; therefore be cautious. If you are meek and humble, perhaps you may be told what light is made of, and also how to make it, and the theory proved both by synthesis and analysis.[4]

The membership of the Society was by no means static—William Withering was asked to join soon after his arrival in Birmingham in 1775, and Priestley upon his transfer there in 1780. However, the group lost the company of Erasmus Darwin when he removed to Derby, but not his vitalizing spirit, for he was wont to send frequent communications such as, "I am here cut off from the milk of science which flows in such redundant streams from your learned Lunatics, and which, I can assure you, is a very great regret to me," and again, "I hope philosophy and fire-engines con-

[3] *Ibid.*, p. 4. [4] *Ibid.*, p. 5.

tinue to go on well. You heard we sent your society an air-balloon which was calculated to have fallen in your garden at Soho, but the wicked wind carried it to Sir Edward Littleton's. Pray give my compliments to your learned society."[5]

Another contemporary picture of the group can be found in the Memoirs of the daughter of one of the members—Mary Anne Galton (later Mrs. Schimmel Penninck). After describing Mr. Boulton, whom she called "the father of Birmingham," she turned to his partner, James Watt.

> Mr. Boulton was a man to rule society with dignity; Mr. Watt to lead the contemplative life of a deeply introverted and patiently observant philosopher. . . . Whilst Mr. Boulton's eye and countenance had something of radiance, Mr. Watt's were calm as if patiently investigating or quietly contemplating his object. His utterance was slow and unimpassioned; deep and low in tone, with a broad Scotch accent. His manners gentle, modest, unassuming. In a company where he was not known (unless spoken to) he might have tranquilly passed the whole time in pursuing his own meditations; but this could not well happen, for, in point of fact, everybody practically knew the infinite variety of his talents and stores of knowledge. When Mr. Watt entered a room, men of letters, men of science, nay, military men, artists, ladies, even little children thronged around him. I remember a celebrated Swedish artist [Brenda] having been instructed by him that rats' whiskers made the most pliant and elastic painting brush. Ladies would appeal to him on the best means of devising grates, curing smoking chimneys, warming their houses, and obtaining fast colours. I can speak from experience of his teaching me how to make a dulcimer and improve a Jew's harp.[6]

Mrs. Schimmel Penninck then proceeded to the other members. Dr. Withering, she wrote, was of quite different aspect. "He was the personification of that which belongs to a physician and naturalist. Enormous were his organs of proportion and individuality, and great were his powers of active investigation and accurate detail." Of Priestley she said: "He was a man of admirable simplicity, gentleness, and kindness of heart, united with great acuteness of intellect. I can never forget the impression produced on me by the serene expression of his countenance. He, indeed, seemed present with God by recollection and with man by cheerfulness." Captain Keir, the chemist and writer, she characterized as "the wit, the man of the world, the finished gentleman who gave life and animation to the party."[7] In this he was ably assisted by Dr. Stoke, a local physician, who was "profoundly scientific and eminently absent." Dr. Stoke's reputation for absentmindedness rested, apparently, on such incidents as the following:

[5] *Ibid.*, p. 6. [6] *Ibid.*, p. 7. [7] *Ibid.*, p. 8.

On one occasion when the Lunar Meeting, or *Lunatics,* as our butler called them, were seated at dinner (a blazing fire being in the room) we were astonished by hearing a sudden *hissing* noise, and seeing a large and beautiful yellow and black snake rushing about the room. My dear mother, who saw it was not venomous said to me ::Mary Anne, go and catch that snake," which after some trouble . . . I succeeded in accomplishing. We were wondering where it could have come from when Dr. Stoke said that as he was riding along he had seen the poor animal frozen in a bank, and put it in his pocket to dissect, but the snake had thawed and escaped from his pocket. The doctor praised me very much for my prowess, and as a reward he made me a present of my prisoner, which I long kept in a glass jar and carefully tended every day.[8]

It was in this intellectual milieu that William Withering was to make his several distinguished contributions to medicine, to botany, and to mineralogy.

II. WITHERING'S CAREER

Withering received his early training in Latin and Greek from a neighboring clergyman, the Reverend Henry Wood of Ercall, who prepared him for entrance to the University of Edinburgh.

Edinburgh during the second half of the eighteenth century was the strongest university center in all of Britain, for Oxford and Cambridge under the Test Acts had degenerated into "palsy-stricken shadows of their former selves." They had become "schools chiefly for the use of the clergy who had an almost exclusive part in their management"; when Edward Gibbon went up to Magdalen College, Oxford, he left in disgust after a year because he found his tutors "plunged deep in port and prejudice." Edinburgh, on the other hand, had not felt the stultifying blight of the Test Acts, and many a proud Scot taunted his friends south of the border with the fact that they were obliged "to come North for enlightenment." And enlightenment there was, for Edinburgh was feeling the full effect of the academic renaissance which was taking place on the Continent and especially in Holland, whither many young Scotsmen had gone to improve their minds; if they were medically inclined, they usually went to Leyden for their degrees.[9] Thus Andrew Sinclair had gone there in the 1720's, and had found himself much stirred by a course of lectures called "the institutes of medicine," given each year by the great Boerhaave who, believing that his medical students did not have adequate

[8] *Ibid.,* p.

[9] Smith, R. W. Innes. *English-speaking students of medicine at the University of Leyden.* Edinburgh, Oliver and Boyd, 1932. xxii, 258 pp.

background in the basic sciences ancillary to medicine, had begun in 1700 to offer a new course which would afford them more adequate preparation.[10] This marked the first formal teaching in that academic discipline which we now refer to as physiology.

Boerhaave's influence extended to Edinburgh where a Chair of the Institutes of Medicine[11] was established in 1726 with Sinclair as its first encumbent. He was succeeded by Robert Whytt, the eminent Scottish neurologist and neurophysiologist who in 1751 had published his famous *Essay on the Vital and Involuntary Motions of Animals* setting forth for the first time the concept of reflex action. Whytt occupied the chair of the Institutes when Withering entered as a student, and Withering was profoundly stimulated by his lectures and writings.

There were other figures equally prominent on the Edinburgh faculty at this time, among them Alexander Monro *primus* who established the dynasty of Edinburgh anatomists; Joseph Black, the outstanding chemist, best known, perhaps, for his discovery of fixed air but whose influence on the progress of chemistry far transcended his work on the gases; and then there was that colorful figure, James Hutton, who was writing a treatise on agriculture and also formulating the bold concept that was so to alter the course of geological thought, later published in his monograph *The Theory of the Earth*. But of all the stimulating men who dominated the local scene when Withering began his medical studies it was probably William Cullen, Professor of Medicine, who most influenced his thinking. Withering wrote of him: "His affable disposition, as it were, engaged us in the pursuit of knowledge. His modesty is such that whatever he advances as new he cautions us thoroughly to examine, and only to embrace with 'a slow consenting academic doubt.' "[12]

In accordance with custom, a tutor, one Dr. Hay, an experienced and hospitable physician, was assigned to Withering and he served as a valued mentor and guide during his four years at the northern seat of learning. Unfortunately, very few letters from Withering during this period have been preserved, so his first

10 Fulton, J. F. The influence of Boerhaave's *Institutiones medicae* on modern physiology. *Ned. Tijdschr. Geneesk.*, 1938, *82*, 4860-4866.

11 From Edinburgh chairs of physiology (referred to as the institutes until the end of the nineteenth century) spread to every other English-speaking university. At McGill, for example, Osler became Professor of the Institutes of Medicine and the title of the department was not altered to physiology until 1898.

12 [Withering, W. (the younger)]. *The miscellaneous tracts of the late William Withering, M.D., F.R.S. to which is prefixed a memoir of his life, character, and writings.* London, Longmans, Hurst, Rees, Orme and Brown, 1822. 2 vols. [Vol. I, p. 18.]

impressions and experiences cannot be given in his own words, but it is clear that he made many warm friends and in later life continued in correspondence with teachers and classmates of his student days. Too close application to sedentary occupations undermined his health and he found therapeutic outdoor exercise in the national game of golf. Music was another outlet, and in addition to being accomplished on the German flute and harpsichord, he won his way to the heart of every patriotic Scot by learning to play the bagpipes.

Following the practice of British students he spent his spring and summer holidays travelling, usually accompanied by a fellow student. After visiting the Peak district of Derbyshire during his second vacation, he went to London where he walked the wards of hospitals and attended medical lectures, among others those of William Hunter at Great Windmill Street. He took his degree of doctor of physic on 31 July 1766, after a successful defence of his inaugural dissertation on malignant putrid sore throat which he published under the title, *De angina gangraenosa.*[13]

Since it was fashionable for young men to supplement their formal education with a trip to the Continent, Withering made such a journey during the summer and autumn following his degree. He enjoyed the first part of it, but his companion, a Mr. Townsend (described as "a gentleman of independent fortune familiar with the manners and language of the French"), fell ill in November and died. The circumstances are described in a letter to his parents, which incidentally gives a hint of the love of freedom that later caused him to identify himself with such free-thinking groups as the Lunar Society.[14]

Paris, Nov. 5th, 1766.

Dear Parents—I have been so much taken up for some days past that it was impossible to find time to write; I have lost my Fellow traveller Mr. Townsend; an abscess formed upon his shoulder, a Fever came on, the wound gangren'd and yesterday he died. The third day from hence I purpose setting out on my return home; the third day after that shall be at Rouen in Normandy and then will give you a longer and more particular account of things. I shall for the future enjoy greater pleasure in England than I could have done if I have never left it; those who have not felt and seen the effects of Arbitrary power can never taste with full relish the sweets of Liberty. I wish that those who are discontented with British Government were all able to be transported to ..... I have much to say, but it is not

[13] The original text and translation of the thesis follow in this number of the *Journal.*

[14] From the collection of unpublished Withering letters in the Royal Society of Medicine, London. I am much indebted to the Librarian for permitting me to quote it.

safe to speak. Amongst the greatest Blessings I find in France let me mention a good State of Health. This is a short letter, but have not time to make it longer, and I thought a short one would be better than none, from your dutiful Son Wm. Withering.

After Christmas at home Withering began to consider the matter of setting himself up in a general practice. Flattering offers came from Chester and Coventry, but he finally selected the small town of Stafford in southern Staffordshire. Here he was fairly near home, where the reputation both of his father and of his physician-uncles was well known. He became physician to the newly built infirmary and while he was well liked, rural communities in Britain, then as now, were slow to accept newcomers, with the result that Withering had time to make himself one of Britain's most eminent botanists. Although he had found the study of botany uninteresting at Edinburgh, he was nevertheless drawn into it by his intimate friend Richard Pulteney who later became the historian of British botany and the first English biographer of Linnaeus. Another circumstance also influenced him. One of his first patients at Stafford was Helena Cooke, a young amateur painter of flowers. To amuse her during her illness and long convalescence, Withering fell into the habit of searching the countryside for specimens that she might paint. One thing led to another, and on the 17th day of September 1772 Miss Cooke became Mrs. Withering.

Having thus been led indirectly into the field of botany, Withering soon found himself spending much time collecting the rich flora of the region for systematic classification and study. So seriously did he pursue this avocation that he was able eventually to issue the two-volume treatise on the plants of Britain which has become a classic.

Following his marriage Withering began to cast about for a more profitable practice since his income did not exceed £100 a year. When, therefore, he received an unexpected letter in February of 1775 from Erasmus Darwin telling him of the death of Dr. Small of Birmingham and suggesting that there was thus a good opening for a competent young practitioner in the busy Midland metropolis, he accepted the proposal with enthusiasm. Later in the year he was appointed a junior assistant to Dr. John Ash of the General Hospital. He started in practice in May and moved his family to Birmingham later in the year.

Withering's success in his new environment was immediate. Not only was he taken into social and intellectual circles, but his practice quickly grew to one bringing in an income of £1000 a

year, later £2000, an enormous sum for those days—and this despite the fact that he held a daily free clinic for the poor at the General Hospital and is said to have treated three thousand cases annually without charge. He was sought as a consultant from all over the Midland and western counties. He also began to conduct a huge correspondence with distinguished personages who wrote for medical counsel. One such request came from Paris from no less a person than Benjamin Franklin who sought advice about treating his "bladder stone."

In the year 1785 Withering made a record of the distances he had travelled for consultation and found that it added up to 6,303 miles—not far perhaps for these days, but for the horsedrawn vehicles and bad country roads of the eighteenth century it was an astonishing feat. But the time was not wasted, for he occupied himself during his long journeys in making his clinical notes and examining specimens of his plants and minerals. However, the demands began to tell on him and he was obliged to take things more easily. He continued to practise at Birmingham off and on until 1799, but a serious setback in 1783 and another in 1786 forced him on each occasion to give up work entirely and go to the country to regain his health. By now he realized that he was a victim of "consumption" but, unlike most physicians, he had learned his limitations and was able on a restricted regime to accomplish much more than many men who enjoy robust health. He used these enforced rest periods to revise his work on British flora and to study fresh specimens.

In 1790 Withering had a serious attack of pleurisy. Thereafter, until his death, he had shortness of breath and frequent hemoptysis, and to escape the damp of English winters he spent two seasons in Portugal where he enjoyed the warm sun and beach at Cintra near Estoril. Portugal appealed to him because it brought him into touch with tropical and semitropical plants that he had not known in England; he also occupied himself with an investigation of the celebrated hot springs of Caldas and submitted a report to the Royal Academy of Portugal, of which he was made a corresponding member. The trip in 1793 proved to be his last, for his health was seriously failing. He gave up Edgbaston, his beautiful estate in the middle of Birmingham, because he thought its situation was unfavorable and purchased a property on high land known as Fairhill outside of the city where had once stood the house of Joseph Priestley which had been sacked in the riots of 1791. He renamed the property "The Larches" and moved in on 28 September 1799,

but Mrs. Withering was taken suddenly ill and could not accompany him and this in addition to the fatigue of the journey sent him to bed. A few days later a venerable peer came to seek his advice. Withering, scarcely able to hold a pen, outlined a plan of treatment, "by this act closing his career of medical practice." A friend who called to see him on October 5th was responsible for the celebrated pun, uttered sadly and with warm affection, "The flower of English physicians is indeed withering." He died on 6 October, eight days after he had moved into the new house.

III. The Foxglove

Withering's introduction of the use of the foxglove for treating patients with congestive heart failure must be regarded as one of the great milestones of scientific medicine. Decoctions and infusions of the leaves and of the roots of various flowering plants had been in vogue since prehistoric times, and folk remedies were as numerous as the communities into which human beings had divided themselves. Mandrake leaves were used in ancient China to relieve pain. Tea came into vogue as a stimulating beverage at the beginning of the seventeenth century, and of the various stimulants it has proved the test of time more completely than any other plant extract except possibly that from the coffee bean. As a specific remedial agent there is only one other with which digitalis can be compared—the alkaloid derived from cinchona bark which had a checkered career for three hundred years before digitalis was discovered, but unfortunately cinchona during that long interval had no dispassionate Withering to espouse its cause.

The story of how Withering came to investigate the therapeutic virtues of foxglove is best told in his own words:

> In the year 1775, my opinion was asked concerning a family receipt for the cure of the dropsy. I was told that it had long been kept a secret by an old woman in Shropshire, who had sometimes made cures after the more regular practitioners had failed. I was informed also, that the effects produced were violent vomiting and purging; for the diuretic effects seemed to have been overlooked. This medicine was composed of twenty or more different herbs; but it was not very difficult for one conversant in these subjects, to perceive, that the active herb could be no other than the Foxglove.[15]

He tells us that while the drug was first tried out at Stafford, he had a much larger opportunity of testing it on his clinic cases

[15] Withering, W. *An account of the foxglove and some of its medical uses.* Birmingham, G. G. J. and J. Robinson, 1785. 207 pp. [p. 2.]

at Birmingham. At first there was no way of calculating the dose and he soon encountered alarming toxic reactions when the drug was given as a concoction made up of the dry leaves of the plant. Thereafter he began to study the problem of dosage and he found when the leaves were collected green (when the plant was blooming) and then dried and ground up in a powder, that three drams of these powdered leaves, boiled in eight to twelve ounces of water, and administered in two spoonfuls every two hours until nausea developed, generally gave a profound diuresis, slowing of the heart with a strengthening of its beat, and a striking improvement in the general sense of well-being. After this dosage medicines were omitted for the space of three to four days.

Prior to 1779 Withering had been loath to give the drug except in extreme cases, but in that year a number of cases of "dropsy" came to his attention at the public clinic and he once again had opportunity to study the reactions of a large series. Up to this time he seems still to have been skeptical about the drug, probably on the grounds of its early toxic effects, but after he had treated a number (he does not say how many) at the clinic, the reaction to the smaller doses was so favorable that he now began to consider the drug seriously. He had not preserved a record of the clinic group, so he was unable to give particulars, but in February 1779 he heard that his friend, Dr. Stokes, had communicated a report to the Medical Society of Edinburgh on the use of digitalis. This apparently made Withering realize that he must look into the matter more thoroughly and he thereafter began to keep full notes on every case in which he tried the new agent. By February 1785, when he began to prepare his monograph, *An account of the Foxglove,* he had systematic records on 163 of his own cases and on a large number of others which had been reported to him through correspondence.

A tragic but profoundly interesting episode occurred in connection with the early history of digitalis, and it eventually led to an estrangement between Withering and his senior colleague, Erasmus Darwin, who had been responsible for bringing Withering to Birmingham. To tell the story consideration must first be given to Charles Darwin, the son of Erasmus—a precocious lad for whom his father had had high hopes. After a year at Christ Church in Oxford young Charles felt that his mind was going to seed in pursuit of "classical elegance" and he "sigh'd to be removed to the robuster exercises of the medical schools of Edinburgh." Late in

1775 his father entered him there at the age of seventeen and he was taken to live in the house of Andrew Duncun, one of the rising clinical teachers of the school. Darwin quickly made a name for himself, winning the annual gold medal of the Aesculapian Society for an essay on the "differences between mucous and pus." He wrote his M.D. thesis on the absorbent vessels [lymphatics]. At the end of April, following an autopsy on a child that had died evidently of an infectious hydrocephalus, he himself was seized with a severe headache, later with fever, and on 15 May 1778 he died at the age of nineteen years and seven months. Such, then, was the career of the first Charles Darwin, and it would almost seem that Nature, thwarted in her first endeavor, later caused another Charles Darwin to walk the earth and to study its growing things. For those interested in the hereditary transmission of mental traits and capabilities there is no more striking family to study than the Darwins, who for six generations have produced men of outstanding intellectual capacity.

On the 25th of July 1776 Erasmus Darwin saw, in consultation with Withering, a Miss Hill of Aston who, to use modern terminology, was in the last stages of cardiac decompensation with extreme dyspnoea. Her stomach, legs, and thighs were greatly swollen. Since death seemed imminent, Withering proposed digitalis and when writing the case report nine years later he said: "Dr. Darwin very politely acceded immediately to my proposition and, *as he had never seen it given* [italics mine. J.F.F.], left the preparation and the dose to my direction. We therefore prescribed as follows:

R. Fol. Digital. purp. recent. ℥ iv coque ex
Aq. fontan. purae ℔iss ad ℔i. et cola

R. Decoct. Digital ℥iss.
Aq. Nuc. Moschat ℥ii, M, fiat, haust. 2 dis, horis sumend.

The patient took five of these draughts, which made her very sick, and acted very powerfully upon the kidneys, for within the first twenty-four hours she made upwards of eight quarts of water. The sense of fulness and oppression across her stomach was greatly diminished, her breath was eased, her pulse became more full and more regular, and the swellings of her legs subsided.

26th. Our patient being thus snatched from impending destruction, Dr. Darwin proposed to give her a decoction of pareira brava and guiacum shavings, with pills of myrrh and white vitriol; and, if costive, a pill with calomel and aloes. To these propositions I gave a ready assent.

30th. This day Dr. Darwin saw her, and directed a continuation of the medicines last prescribed.[16]

[16] [Withering, W. (the younger)]. *Op. cit.*, vol. I, p. 134.

Darwin evidently wrote to his son about this case, for Charles informed his preceptor at Edinburgh, Dr. Duncan, and by 1779 digitalis was in general use in the Edinburgh Infirmary. Although nothing was published in 1779, Charles Darwin's M.D. thesis was issued posthumously by Erasmus in 1780 under the title *An account of the retrograde motion of the absorbent vessels of animal bodies in some diseases.* Nine case histories of the use of digitalis were appended to the thesis.[17] They purported to illustrate certain remarks made earlier in the text about the action of diuretics. The general assumption is that Erasmus Darwin, in editing his son's thesis, added the case histories himself, for Charles, a mere lad of nineteen, was in no position to administer the drug. But these nine case histories represent the first published account of the therapeutic effect of digitalis on cardiac edema to be published in any language—and they include the now celebrated case of Miss Hill of Aston near Newport. Not content with this, Erasmus again jumped into print prior to Withering in a paper dated 14 January 1785 (read 16 March 1785) under the title "An account of the successful use of foxglove in some dropsies and in the pulmonary consumption." This paper was published in the *Medical Transactions of the College of Physicians,* London, for 1785.[18] Withering does not mention this paper in his own account, although his preface carries the date of 1 July 1785, but his reasons for ignoring it were probably reasonable enough since had he mentioned it, he could quite rightly have accused Darwin of attempting to capitalize on his own discovery. In discussing this controversy some years ago I reached the conclusion that "if one applies modern standards of ethics, one must conclude that the grandfather of the celebrated naturalist was somewhat unscrupulous. If priority of publication means anything in these circumstances, Darwin has indeed a legitimate claim over Withering. However, one must recognize that it was Withering and not Darwin who convinced his medical contemporaries and it was he who inaugurated the systematic use of the drug; he kept full records of his results and published after an

[17] The Charles Darwin tract was promptly reviewed by Andrew Duncan in his *Medical commentaries* for the year 1780. The review must have been written prior to publication of the Darwin tract, for the preface to Duncan's *Commentaries* is dated "1st Jan. 1780." The review occupies ten pages, the last three (pp. 202-204) being devoted to the case reports about digitalis. A full account is given of the case of Miss Hill of Aston although she is not mentioned by name. The Duncan review is important because it was written by a physician of prominence in a book that must have had fairly wide circulation since it was a continuation of a serial publication, the first volume of which was issued in 1774.

[18] Vol. 3, p. 285.

interval of ten years' careful observation a detailed and systematic treatise on its action."[19]

Withering's prominence as a botanist is sometimes lost sight of because of his discovery of digitalis. His years at Stafford had culminated in the publication of a two-volume work entitled *Botanical arrangement of vegetables* (1776),[20] which earned him the title of the English Linnaeus. On the Continent he was probably better known for his botany than he was for the introduction of digitalis.

Withering also achieved an eminent position as a mineralogist principally for his discovery of barium carbonate which is still known as "Witherite" in honor of the man who first proved its chemical constitution, it having been named by the great German geologist, Werner (who did not hold it against Withering that he had sat at the feet of his arch rival, James Hutton). In chemistry he tilted with Priestley over phlogiston but he seems to have admired Priestley too much to take public issue with him. He later turned his attention to the chemistry of the various barium salts, making a detailed study of the reaction of these salts with sulphuric acid. These studies were published in the *Philosophical Transactions* under the title "Experiments and observations on the terra ponderosa."[21] Withering was also an amateur climatologist and meteorologist and contributed a number of reports to meteorological journals. His interest in climatology stemmed from his observance of weather conditions on his own state of health; he found that sunlight and dry air increased his sense of well-being and eased his respiratory distress, and he was given to sending his more wealthy patients to places having a salubrious climate.

Although only fifty-eight years of age at the time of his death, Withering had won an enviable reputation and high honors in two fields of science. He had been elected a Fellow of the Royal Society, of the Linnaean Society, and of the Medical Society of London, a particular mark of distinction for a physician from the provinces. Withering had lived through one of the most significant periods of history, having witnessed the introduction of the spinning jenny, the cotton gin, and the steam engine—this latter through the efforts of one of his friends in the Lunar Society.

[19] Fulton, J. F. Charles Darwin (1758-1778) and the history of the early use of digitalis. *Bull. N. Y. Acad. Med.*, 1934, *10*, 496-506.

[20] This passed through many editions and with each edition he altered the title. In 1787 he began to issue the second edition which ultimately appeared in three volumes under the title of *Botanical arrangement of British plants*. There was a third edition in four volumes in 1796 and there were several posthumous editions.

[21] 1784, *74*, 293-311.

Although capable of the detached concentration of the scientist, Withering nevertheless took a keen interest in the affairs of men far outside his immediate orbit and there was a constant stream of visitors at Edgbaston Hall, many of them from abroad, who sought him out both as botanist and physician. His sympathy with the principles underlying the French Revolution nearly cost him his life at the time of the Birmingham riots.

If one now journeys to Birmingham, one can find Edgbaston Hall, a fine old Queen Anne mansion, still intact. The great estate, nearly a mile in extent, stands in the geographical center of industrial Birmingham, flanked on one side by the university, by Edgbaston residential houses on another, and with the humming factories of the metropolis not far distant. On the estate near the house is Edgbaston Old Church in which Withering had directed that he be interred without ostentation and with the simplicity which characterized all he did. "Accordingly, with the customary clerical and medical attendants, his remains were, on the 10th of October, conveyed to Edgbaston, and deposited in a vault beneath the church by six honest peasants, chiefly those who had been employed by the family whilst resident in that parish. The funeral solemnities were impressively performed amidst a deeply-affected assemblage of persons, who, uninvited, thus paid their tribute of respect for the deceased. Over this grave the Clergyman and the Dissenting-minister mingled their tears, and together offered up their devout aspirations."[22]

REFERENCES

In addition to those mentioned in the footnotes, the biographical sources used in preparing this brief account of Withering's life are as follows:

RODDIS, L. H. *William Withering. The introduction of digitalis into medical practice.* New York, Hoeber, 1936.

WYNN, W. H. William Withering, M.D., F.R.S.: A memoir. *Birmingham med. Rev.*, 1926, *n.s. 1*, 45-63.

DAWSON, W. T. and CHAPMAN, J. Withering on digitalis, 1785. *Ann. med. Hist.*, 1934, *6*, 31-34.

HALE-WHITE, W. Catalogue of the Withering letters [unpublished] in the library of the Royal Society of Medicine, London. This collection was bequeathed to the Royal Society by Sir William Osler.

22 [Withering, W. (the younger)]. *Op. cit.*, vol. I, p. 200.

A Translation of William Withering's *De angina gangraenosa*

CHARLES D. O'MALLEY*

WITH AN INTRODUCTION BY JOHN F. FULTON

THE earliest writings of men who later became prominent are always of great interest to those who concern themselves with the development of genius. One thinks of Osler's "Christmas and the Microscope,"[1] Lister's "Observations on the Contractile Tissue of the Iris,"[2] of Humphry Davy's "Nitrous Oxide,"[3] published when he was twenty-two, and of many others.

William Withering's medical thesis, *De angina gangrænosa*, published at Edinburgh when he was twenty-five years of age, is likewise peculiarly interesting because it proclaims him a keen observer and a man who had gained unusual clinical wisdom early in life. During the eighteenth century, and indeed up to the present time, the diphtheritic sore throat, with its characteristic membrane, was frequently confused with scarlet fever. The first unmistakable account of scarlet fever was given by John Fothergill (1712-1780) in 1748[4] (see Still[5]). This was followed by Huxham's (1692-1768) description of malignant sore throat in 1757, but Huxham assumed that he was probably dealing with cases of diphtheria, and he observed, incidentally, the paralysis of the soft palate which so often attends diphtheria.[6]

The first to single out scarlatina as a separate entity and to distinguish it from diphtheria was the elder Mark Antoine von Plenciz (1705-1786) of the Vienna School,[7] and he attributed the condition to a *contagium animatum*. Along with Fothergill and Huxham, the young Withering did not clearly distinguish scarlatina from diphtheria, yet he gave the best description of classical scarlatina to be found up to that time in medical literature.

* Stanford, California.

1 *Hardwicke's Science—Gossip*, 1 February 1869, p. 44.

2 *Quarterly Journal of Microscopical Science*, 1853, *1*, 8-17.

3 *Researches, chemical and philosophical; chiefly concerning nitrous oxide, or dephlogisticated nitrous air, and its respiration.* London, J. Johnson, 1800. xvi, 850 pp.

4 *An account of the sore throat attended with ulcers; A disease which hath of late years appeared in this city, and the parts adjacent.* London, C. Davis, 1748 [Dec. 1], iv, 62 pp. (The second edition of 72 pp., also dated 1748, probably appeared on January 8, 1749, as the foreword in Fothergill's own annotated copy in the Royal Society of Medicine is so dated in Fothergill's hand.)

5 Still, G. F. *The history of paediatrics. The progress of the study of diseases of children up to the end of the seventeenth century.* London, Oxford University Press, 1931. xviii, 526 pp., 63 pl.

6 *A dissertation on the malignant, ulcerous sore-throat.* London, J. Hinton, 1757. [iv], 70 pp.

7 Plenciz, M. A., Sr. *Tractatus III. De scarlatina. Vienna*, J. T. Trattner, 1762. 223 pp. In *Opera medico physica in quatuor tractatus digesta.* Vienna, J. T. Trattner, 1762.

Only a few copies of the thesis were printed. The libraries at Edinburgh do not possess it, and Withering's most recent biographers, Louis Roddis[8] and Peck and Wilkinson,[9] had not seen it. In the official biography of Withering, written by his son and published in 1822 as an Introduction to his collected writings,[10] the thesis received scant mention. The copy from which this translation was made was acquired three years ago for the Historical Library at Yale from the well-known London dealer, H. A. Feisenberger.[11] The thesis has never been reprinted or translated. In 1779 Withering published *An account of the scarlet fever and sore throat . . . as it appeared in Birmingham in 1778*,[12] the second edition of which was brought out in 1793.[13] Here one finds a detailed clinical description of the disease and recommendations concerning therapy, but no part of the text of these later two publications derives from the thesis, and it thus becomes the more important for us now to have the original text. Since the brochure is so rare, we venture to include the Latin text along with Professor O'Malley's excellent translation which follows.

[8] Roddis, L. H. *William Withering. The introduction of digitalis into medical practice.* New York, Paul B. Hoeber, 1936. xiii, 131 pp., 8 pl.

[9] Peck, T. W. and Wilkinson, K. D. *William Withering of Birmingham, M.D., F.R.S., F.L.S.* Bristol, John Wright, 1950. viii, 239 pp., 52 pl.

[10] [Withering, W. (1775-1832)]. *A memoir of the life, character, and writings, of William Withering, M.D., F.R.S., etc., etc., being a biography of 248 pages prefixed to the miscellaneous tracts of the late William Withering* [1741-1799]. London, Longmans, Hurst, Rees, Orme and Brown, 1822. 2 vols.

[11] Copies have now been located in the following libraries: Liverpool Medical Institution, Manchester University Library, Royal College of Surgeons, Royal Society of Medicine, Wellcome Historical Medical Library, University of Edinburgh, Armed Forces Medical Library (2) College of Physicians, Philadelphia, New York Academy of Medicine.

[12] *An account of the scarlet fever and sore throat, or scarlatina anginosa; particularly as it appeared at Birmingham in the year 1778.* London, T. Cadell, etc., 1779. *ii*, 132 pp.

[13] *An account of the scarlet fever and sore throat, or Scarlatina anginosa; particularly as it appeared at Birmingham in 1778. To which are now prefixed, some remarks on the nature and cure of the ulcerated sore throat.* Birmingham, M. Swinney, 1793. 2 *ll.*, 127 pp.

AN INAUGURAL MEDICAL DISSERTATION CONCERNING GANGRENOUS ANGINA

which with the Approval of Divine Power and on the Authority of the Very Reverend Man, William Robertson, S.S.T.P., Prefect of the University of Edinburgh, as well as with the Consent of the greatly esteemed Senate of the University and by the Decree of the very noble Faculty of Medicine is presented for the consideration of the learned for the Degree of Doctor and in pursuance properly and lawfully of the Highest Honors and Privileges in Medicine by William Withering, Englishman, on the 31st day of July, at the accustomed hour and place.

. . . . . heavily falls the breast
Blinded are the eyes
Strength is lacking and scarcely does the
voice escape the throat.

Anti-Lucret. Bk. V.

Edinburgh
Auld & Smellie, Printers
M D CC LXVI

In greatest honor of my uncle, a truly learned man, greatly distinguished in the liberal arts:

Brooke Hector of Lichfield, M.D.,

for the sake of his very friendly regard by which he has always encouraged me and my studies. As well as the very reverend man Henry Wood, Promoter of humane letters, most faithful preceptor, very sedulous protector of youthful years, very liberal and friendly Counselor: for the very best advice in the pursuit of studies and countless kindnesses offered to me, I wish this Medical Dissertation to be the record of a grateful mind.

William Withering

A Medical Dissertation Concerning Gangrenous Angina*

Of the various sorts of angina of which accounts have been given, none requires the aid of medicine more than that of which it is my intention to present a brief account. I have the more readily believed that the task ought to be undertaken because this disease, although almost entirely unknown to our forebears, has occurred in our times, as well as a few years before, in many regions of Britain. Moreover, before its nature was explained by those very distinguished men, Fothergill, and, after him, Huxham, the disease had killed many of its unfortunate victims, whether through error or because physicians paid little attention to it.

* The references in the footnotes of the thesis are given here as they appear in the original except that they have of necessity been renumbered.

Aretaeus, the most ancient writer on this disease, called it Egyptian or Syriac ulcers.[1] Later writers gave it now one name, now another, of which these are the most common: Crusted and pestilential ulcers of the tonsils;[2] Pestiferous ulcers in the tonsils;[3] Epidemic angina; Pestiferous, malignant and contagious epidemic angina;[4] Strangling and lethal ulcers of the pharynx and throat;[5] Pestilential angina;[6] Garrotillo;[7] Epidemic angina of children;[8] Epidemic Neapolitan angina;[9] Crusted fever;[10] Suffocating affection, Strangling carbuncle, Strangling phlegmon, Pestilential and child strangling abscess disease of the throat, Pestilential tonsils, Malignant aphthae, Strangling disease, Noose of the throat, Epidemic plague of the throat;[11] Gangrenous angina;[12] Sore throat attended with ulcers;[13] Malignant ulcerous sore throat;[14] Pelham sore throat; Cancerous angina.[15] These names, however much they differ, all denote the same disease. For although they may seem to differ in certain things, yet those differences ought to be regarded as based upon the different nature of regions, different kinds of diet and different opinions and ways of speaking among mankind, rather than to the nature of the disease itself, since the important indications are always the same.

Definition

There is nothing more desirable in the arts, or in any part of the discipline of letters, than that he who is about to present in literary form anything worthy of consideration should be able, on the threshold of the work, to encompass it in a few words and disclose to others what its nature is. But since our present knowledge is uncertain and as yet inconclusive, the definition of the problem, always difficult to present, often cannot be completely accomplished. Furthermore, while such definition is of use to the art of medicine, yet the most highly skilled and learned authors and

1 Aretaeus Cap. De causis et signis morb. c.9 p. 7.
2 Aetius tetr 2. sermo 4. cap. 46. p. 397.
3 Paulus Aegineta De re med. lib. 3. cap. 26. p. 449.
4 Petri Foresti Observat. med. 2 scholia, p. 190.
5 D. Ludov. Mercati oper. tom. 5. consult. 24, p. 134.
6 Joannis Wieri opera, p. 910.
7 Zacutus Lusitanus De praxi medica admiranda, lib. I, observ. 92, p. 73.
8 Libello Thomae Bartholini De ang. pueror.
9 Thomae Bartholini Epist. med. cent. I. p. 340.
10 Bernard. Ramaz. Constit. epidem. obs. 17. p. 110.
11 Cortesii miscellanea medica, 696. Severin. et Moreau Epist. ad Th. Barth. De laryng.
12 Mead's Monita medica.
13 Fothergill's Account, &c.
14 Huxham's Dissertation.
15 Nova acta eruditorum, anno 1758.

professors often dare not even attempt this difficult thing; wherefore much less should I hope that I will achieve a successful result in a matter of such difficulty. Hence, since it is necessary that diseases be distinguished one from another by certain signs and differences, yet, if we err in defining "Inflammation of the surface of the pharynx very frequently attended as well by ulcers and contagious putrid fever," I do not doubt that the readers will grant me their indulgence.

An Account of the Disease

Gangrenous angina usually occurs before middle age. It begins with lassitude and dizziness such as usually precede faintness; then to this succeed a slight chill and shivering which soon give place to high fever. Thus chills and fever alternately succeed one another for several hours until finally the fevers conquer. Acute headache is felt and in some who are affected gravely, pain in the back and joints as well. A degree of plenitude is perceived, and in the sicker patients more than merely a soreness of the throat. The patient coughs a little and becomes a little stiff; the muscles of the neck and shoulders, when they are frequently moved, are sore; inquietude and an inexplicable anxiety, faintness, heaviness around the diaphragm and frequent sighs are complained of. Nausea, vomiting, and diarrhoea torment the patient, but in children vomiting and bowel movements occur more often, and often simultaneously. In many, the face becomes flushed and swollen, but in some, pallid and drawn. The eyes appear dull, bloodshot, and moist as from weeping. In a few hours after the onset of the disease, and in some directly from the beginning, the uvula and tonsils are observed to be swollen and inflamed. Those parts, such as the soft palate, each buccal cavity near the entrance to the pharynx, or rather the rear of the pharynx, become very reddish, or may possibly be of scarlet color. Through the uvula, tonsils, soft palate, and the rear of the pharynx many whitish or ashen spots are distributed, of which the bordering areas become reddish. These spots are often of great number and size, although in some patients they are otherwise, whether you inspect the number, size, or finally their position. The parotid glands and those of the jaws are much swollen, hardened, and painful to the touch. The face, neck, chest, arms, and hands frequently take on the color, more or less, of erysipelas [i.e., reddish] and become swollen. Through the same places very reddish, narrow, lentil-like bodies appear, whereupon the nausea almost immediately ends and the

vomiting and diarrhoea come to a halt. The end of the tongue is whitish and moist, and thick, yellowish, or brownish crust covers the posterior part. There is not much thirst, but the patient complains of a putrid odor in the throat and nostrils; breathing is bothered by those things present. The interior of the nostrils becomes very reddish or almost livid; or very often blood flows from the nostrils, from the mouth, and in women, by no means rarely from the uterus. Yet the throat under consideration swallows things more easily than you might believe, and solid things descend through the throat less painfully than liquids. The skin is hot, dry, roughened, and covered with a mild sweat. At the onset of the disease the urine is palish and resembles the watery part of milk, and especially in many adult patients it issues forth in small quantity and of deep color. In many the arteries have a weak and swift pulse; in some the beat is heavy and fluctuates. The blood is of a shiny, reddish color, and when the thick part has been separated, it is a very yellowish serum. Feverishness is much increased at night, and delirium affects some in the evening. With daylight, sweat breaks forth and there is some alleviation; this usually occurs throughout the course of the disease.

With the advance of the disease, inquietude and anxiety, together with difficulty in swallowing, are much increased. For some are wakeful and tormented by constant frenzy, others lie so stupified that although from time to time starting up they take no notice of it. With the curbing of the diarrhoea, they usually become constipated, although if the disease is severe, the diarrhoea remains to the end. The face is swollen, yellowish and shiny, and the neck very swollen and oedematous; the eyes appear to have lost their animated quality and take on the appearance of a dead glassiness. The crusts of the throat increasing in number and size run together and form a single, large one of darkish color, or rather the surrounding parts now become more livid. The skin of many is covered with petechiae and purplish macules. Now the breath is bad and the odor intolerable. A thin discharge flows from the mouth and nostrils, and it is so sharp that it corrodes the parts which it touches and gives rise to blisters on the face, hands, and arms of the patient as well as of the nurse. In children, sneezes, diarrhoea, griping, a false urge to defecation, and corrosion of the nates and anus occur. There is a great amount of purulent matter, in some tinted with blood, in others completely livid and of loathesome odor. At this time breathing is much more difficult and is a stridulous rasp, the voice hoarse as if carried from the chest; the

urine, more colored, is yellowish as if mixed with bile. The arteries pulsate very swiftly and with a thin beat; in some the stroke is intermittent and completely irregular.

In young children the disease is almost completed in the space of five or six days. In adolescents, or those who have passed those years, sometimes death occurs on the second or third day, but some draw out their miserable life to the tenth or twelfth day.

Inspection of Cadavers

The dissection and inspection of cadavers, which greatly assist disclosure of disease, lay bare things never suspected and illustrate on a more solid foundation the knowledge of causes, places, and our reasons and considerations. Hitherto it has been too much neglected. And even now although much has been essayed, yet more remains which must be attempted and investigated. It is regrettable that in what pertains to this disease, the keen ability of Morgagni is not available for careful exploration of the interior parts of all the cadavers.

Since public cadavers were lacking and since some private ones had been obtained by that very capable, learned, and especially lovable youth, my friend Nooth who seeks with me the laureate of medicine, I shall present those things which have been observed in two dissected cadavers.

A woman in the space of three months after parturition was involved in gangrenous angina; with the advance of the disease. exanthemata appeared on her chest; her bowel yielded a slimy substance, with griping; on the eighth day she died. When the cadaver was opened, the membrane lining the pharynx and superior part of the oesophagus was found to be thicker than normal and strewn with crusts of tawny color. These were easily removed, and the underlying parts appeared eaten away just as if something had been removed from there. The pharynx had lost the reddishness which it possessed when she was alive. The interior membrane of the larynx was thicker than usual and more reddish, and the stomach and the intestines contained slimy matter. Around the throat the lymphatic glands were enlarged, but the salivary glands under the tongue seemed not at all affected. The lymphatic gland situated immediately above the extension of the parotid was greatly swollen, but the parotid gland itself, not at all. Hence the swellings which were thought to have arisen from affections of the parotid and the salivary glands in the jaws were, in truth, of the lymphatic glands, and affected because they received the sharp

matter from the ulcers of the pharynx. It is probable then that the salivary glands are affected only by the remaining swollen parts. It seems desirable to add to what has been said above, that upon the removal of fourteen ounces of blood, this woman's arteries had fluttered very weakly; but her strength was wholly broken, and, although assistance normally very helpful was employed, she was unable to regain her former strength and health.

Likewise, a youth, a boy five years old, died of this disease, and when the cadaver was examined, it displayed a much thickened membrane lining the pharynx, not incrusted, but with ulcers and livid macules creeping through and covering a large part of the oesophagus, the larynx free of the disease, and the pituitous membrane of the nose remarkably swollen. This boy when alive had lacked exanthemata; but the bowel having been loosened, he was distressed through the whole course of the disease.

In certain cadavers dissected by our distinguished Monro the Father, the interior part of the larynx was found to be lined by such sort of tunic as occurs in stridulous suffocation. This, to be sure, does not occur in all, and the cadavers of those who were so affected when alive breathed during the time of the disease in the manner of those affected by stridulous suffocation.[16]

Also it can happen that gangrenous angina and stridulous suffocation produce the same at the same time. And the more so because the distinguished Whytt who recently taught medicine in this university, demonstrated that, in addition to stridulous suffocation with inflammation, another species of the same disease occurs at the same time, which he called putrid and malignant.[17] To be sure, these species are scarcely ever conjoined in the southern part of England, for Huxham testifies that not even once has he perceived in gangrenous angina that acute barking sound which is often heard in angina with inflammation.[18]

16 "There ought to be added that which was found by the celebrated professor of anatomy and surgery, Roland Martin, in one of the victims of the epidemic which attacked Stockholm at that time. In the presence of and with the very eminent and learned assistance of the doctors Strandberg and Darelius of the Royal College of Medicine, he dissected a child which had died of this disease. He observed the trachea internally to be everywhere covered by a very thick membrane. It was found to be greyish and filled with putridity in that part of the tube where it adhered to the walls; the exterior, a bloody-purplish color. In the bronchi concealed by the lung, the cartilages had made notable impressions in it. The farther he descended, the less reddish it was, and wholly whitish in the branches of the bronchi where it displayed the sort of membrane which internally lines the shell of an egg; and whenever it was extended it was able to be distinguished clearly from the special membrane of the bronchi. The lungs were not inflamed, nor injured in any way, so that it was clear that the child had died from suffocation." See Diss. med. inaug. de Angina Infantum, H. C. D. Wilcke, p. 6.

17 In Praelectionibus clinicis.

18 Huxh. diss. p. 280.

Of Exanthemata

Frequently on the second or third day of the disease a great quantity of pustules which in Greek are called ἐξανθήματα arise throughout the upper portions of the body. The back of the neck, neck, chest, arms, and hands are of reddish color and have a certain degree of swelling, and through these parts many papules, small and more reddish than the surrounding parts, are scattered. The same things occur larger in those patients and in those same parts where the reddishness is less.[19] In some they are very conspicuous, but in others they are so small that they are realized more by touch than by sight. If the swelling is great, the arms, hands, and fingers become stiff and slightly painful.[20]

Reddishness and exanthemata constantly remain on the surface of the skin not so much at this stage of the gangrenous angina as when it appeared.[21] For in some, the exanthemata mark the skin before the angina, but very severe angina attacks others, especially adult patients, without exanthemata. These thereafter convalescing are afflicted with severe itching and abscesses of the epidermis (*cuticula*).[22]

The pustules of this disease, when Ramazzini first observed it, were so noticeable that he thereafter called it crusted fever, and it may be learned from that author that their surface, just as now, varied in appearance.[23]

Indeed, in Italy they were often completely absent, which is very probable since many Italian writers made no mention of them.

Prognosis

After the end of the first day of the disease some are convalescent. In many the following signs of health appear on the third, fourth, or finally fifth day: remittance of excessive faintness, which is a favorable omen; gradually the reddishness of the surface of the skin decreases; the fever is lessened and a gentle, light sweat breaks forth equally through all the members; the arteries pulsate more slowly, strongly, and evenly, and breathing is gentler and easier; some quality of animation and firmness returns to the

19 Foth. acc. p. 33.
20 Huxh. diss. p. 282.
21 Dr. Wall's letter. Gent. Mag. 1751. p. 499.
22 Huxh. diss. p. 281.
23 They were varied and of diverse color, in accordance with the varied and diverse constitutions of the patients; some were red, others pallid, others of a darkish color; some small, some broad, some raised, some flat so that one might observe them only by directing his gaze horizontally [i.e., across the plane of the area]. This last kind of pustule was very ominous. Bern. Ramazz. constit. epidem. obs. 19. p. 111.

eyes;[24] the crusts of the pharynx gently and mildly disappear, and the clean, florid ulcers seem to turn into flesh; the soft swelling of the neck decreases; sleep is not disturbed, wakefulness is tranquil, and the appetite returns. The urine is turbid, and in it is a sediment in the form of meal. The diarrhoea ends a little earlier. Some expectorate much from the chest, others very little or not at all. Exanthemata appearing swiftly and speedily frequently promise a joyous conclusion; and the more so if a considerable peeling of the epidermis (*cuticula*) follows.

On the other hand, with rigor supervening, and the exanthemata either suddenly vanishing or turning to a darkish and livid color; the pulse of the arteries very slight, swift, agitated and uneven; the skin hot with dryness, breathing more difficult; continued anxiety; the pharynx very reddish, nearly livid, and drying with a kind of sheen signify that the affliction has become highly perilous. Truly, dull and opaque eyes; pallid and limpid urine; approaching frenzy or coma, with stupor of the countenance and sweat in the extremities; danger of gasping or suffocation; and with this a particular kind of convulsion of the muscles of the throat; sudden relaxing of the bowel, producing a kind of liquid matter of foul odor in the patient; the back of the neck, neck, and countenance turgid as if inflated, and appearing cadaverous, the whole body gently swelling—all declare the approach of death.

The age of childhood usually suffers more than the older in this disease. For in addition to the fact that suitable remedies cannot be administered to children, because they do not understand that acrid things and crusts separating from the throat should be coughed up, and these having been swallowed, corrode the stomach and intestines; likewise, the sickness of the whole body, the grippings, inflammation, gangrene, and blood slime which greatly corrodes, and the odors of the bowel, which are very foul, cause them great suffering.

Predisposing Causes

Patients who have loose and humid bodily constitutions are more endangered by gangrenous angina than others,[25] children more than adults,[26] girls more than boys, women more than men and those usually suffering from other diseases more than the robust and healthy.[27]

[24] Actius Cletus Signinus de morb. strangulat. cap. I, p. 6.
[25] Severinus De recondita natura abscess. p. 547.
[26] Actius Cletus Signinus de morbo strangulatorio, cap. I. p. 6.
[27] Foth. diss. p. 49. Aetii Tetr. 2. Sermo. 4. p. 398.

Whatever things weaken the body, in that way expose it to this disease; these are grief,[28] humors immoderately excreted,[29] and similar things. In addition to the weakening of the strength, the following affect the humors by sharp putridity and are very potent for the disease: putrid fevers,[30] smallpox,[31] scurvy, and dysentery.[32] Finally, angina with inflammation makes a pathway for gangrenous angina. For lately with a disease incipient, within two or three days the nature of it has been changed in almost all the indications of it, and by no means rarely is it observed to end as this one.

Opportune Causes

Special causes directly arousing disease are recounted by writers as a rainy and hot region,[33] southerly winds,[34] and dampness of places.[35] These act perhaps in a double way; for they can be joined with the causes mentioned above and cause the disease, or remaining for a long time, and affecting the body badly, finally render it suitable for this disease. But since I have already spoken above of this action, now I shall speak only of the latter. Aretaeus, when he saw that beyond other diseases gangrenous angina attacked Egyptians,[36] conjectured that this occurred because they fed on roots, vegetables, and pungent shoots and obtained their drinking water from the Nile. I do not completely agree with this conjecture; truly, unless I am deceived, the reason must very probably be drawn from the particular site of the region, suffering the inundations of the Nile, so that the natives are carried off by the vapors thus produced, and by the heat of the region, by the river regaining its channel, and by the stinking of what is exposed. This man deserving the very best from the fosterers of medicine, and among the most diligent, considered the dry air as a cause; yet I believe that for once he fell into error, for it ought not to be believed that the air of such a hot region with so great a land surface, so often and so long stagnant, could be dry.

28 Idem. p. 43.

29 Idem.

30 Dr Wall's letter. Gent. Mag. Ann. 1751. p. 501.

31 Idem.

32 Van Swieten comment. §811. p. 683.

33 Van Swiet. comment. §811. p. 683 Humid and hot air especially cause putrefaction; this ought to be understood also of humid and hot bodies (such sort as are infantile), of which the temper is harmed more than any others by putrefaction. Becher. Physica subterranea, I. i. §5.

34 Huxh. diss. p. 273. Foth. acc. p. 31.

35 Aret. Capp. cap. p. 7. Gent. mag. in the place cited above.

36 De causis et signis morborum, cap. 9. p. 7.

Immediate Cause

In all the evidence which appears in this disease, I agree with the distinguished man Fothergill that the immediate cause of it is the putrid slime, or as he says "its miasma." But whether the seed of this disease originates within the conjoined action of antecedent causes, whether it is carried from some bodies to others by touch or by some medium, is a question difficult to investigate. I shall speak a little of this when first I have investigated what will be very worthy of note, whether or not gangrenous angina is contagious. And since the matter has been based on the diligent and faithful observations of those who are experienced in observing this thing, I shall combine their testimonies into one. Severinus says[37] "What pertains to contagion is comprised in this common agreement of all as well as being approved by reason." Zacutus Lusitanus says "In those parts (that is to say, the pharynx) carbuncular inflammations arise from the virulent fluxion of the humor which in the form of a fearful pestilence, or a very quick poison, seizes upon children and adults by a kind of contagion and, attended by severe and very evil symptoms, usually brings very swift death."[38] These are the words of Moreau: "Those who depart along separate paths will agree on one point, that is, it is a pernicious affection, both epidemic and contagious."[39] Wedelius states: "Infantile angina is contagious."[40] When to these the testimony of Fothergill[41] and Wall[42] is added, it will by no means be doubted that gangrenous angina is contagious.

There remains another question to be investigated in the same way: that is, whether this disease is transferred from some bodies to others by touch, or by an interposed medium? Mercatus asserts that either of these things can occur, whose testimony is written below: "Remarkable to say! there was a fearful condition of the humor, so pernicious, powerful and contagious, that it stung the index finger of a father, with which he extracted that humor from the mouth of his son, and it became reddish and painful; thereafter the father complained of difficulty in breathing and swallowing, with pain and swelling of the pharynx, and its color deepened

37 De recondita abscessuum natura, p. 530.

38 Zacut. Lusitan. De prax. med. admir. lib. I. obs. 92. p. 73.

39 Epist. R. Moreau ad calcem tractuli Thom. Barth. de Angina pueror. epidem. p. 128.

40 Wedelius De morbis infantum, cap. 20. p. 77.

41 Foth. Acc. p. 71.

42 Gent. Mag. ann. 1751, p. 497.

and glands appeared outward near the chin. From these things on the second day his expelled breath had a foul odor, so that you can rightly gather that the father had been affected by the contagion of the son."[43]

Anyone who has received only the breath of one suffering from this disease will certainly have to confess that as far as he is concerned, the contagion can be transmitted through the air into neighboring bodies. Dr. Fothergill testified that when this disease arises in a family, unless the healthy are moved away from the sick, it goes through all the children; and also of those of adult years who spend much time among them and receive the exhalation of a nearby breath, few escape the sickness in some degree. Likewise, he judged that thing to occur because 'the putrid virus or its miasma through contagion penetrated into the body.'

Diagnosis

Since I have already defined what gangrenous angina is, it may seem of no value to explain the certain differences which distinguish it from other diseases, which in Greek is called διαγνοσιν. But although a definition may briefly do the same thing, yet it is often worthwhile to examine certain special things and discuss at greater length in what ways the disease which you are considering differs from others close to it, and in what ways it agrees. Therefore as there are three ailments similar to this, aphthae, angina accompanied by inflammation, and lues venerea, I shall demonstrate in order some signs by which they are distinguished from gangrenous angina. No noxious thing infests the pharynx more similar to gangrenous angina than aphthae, for common causes give rise to both, many affections are common to both, and the method of treatment is not dissimilar. These are the distinctions: the ulcers of gangrenous angina are contained in the pharynx, tonsils, soft palate, and uvula; on the other hand, aphthae affect not only the pharynx, oesophagus, and those things nearest to them, but attack the interior of the cheeks, the gums, palate, and tongue.[44] The ulcers of the former creep laterally and are of unequal shapes; the latter appear small and round,[45] and sometimes lack fever. On the other hand, gangrenous angina always has fever,[46] and it is contagious; aphthae are not contagious. The former in color more or less resembles erysipelas; in the

43 Opera, tom. 5. consultat. 24. p. 139.
44 Boerhaavii Aphorism. §981.
45 Idem. §979.
46 Van Swiet. Comment. §983. p. 201.

latter no such color is observed. More distinctions could be presented if more were required.

Since it is very important from the beginning to distinguish gangrenous angina from that which has inflammation, I shall attempt to gather and indicate those signs in which there is some difference. A common shivering is found at the first onset of each, which is incorrectly called by many "bristling of the hair"; in gangrenous angina it is suddenly replaced by fever. The greatest anxiety, faintness, heaviness around the diaphragm, sighs, unusual lassitude, and loss of spirits are special to it. In angina with inflammation, the arteries pulsate rapidly, fully and strongly; in gangrenous, likewise rapidly, but feebly and unevenly. In the former the swelling of the pharynx is great, and the color similar to phlegmonic inflammations; in the latter the swelling increases more slowly and is very scarlet in color which is such a noteworthy indication that he who has once seen gangrenous angina, thereafter only briefly seen, cannot fail to know it. Angina accompanied by inflammation has acute and pulsating pain of the pharynx; in gangrenous, not so much pain as fever and illness are felt. The latter begins with vomiting and frequent bowel movements, the former, never. Finally, when the ulcers appear, then at last the nature of the disease is sufficiently apparent, and doubt is no longer possible. But the mouth and throat must always be gargled before the physician inspects them. When this had not been done, I myself saw the mucous covering the tonsils and the pillars considered to be the crusts of ulcers. Finally, he will hold complete distinctions of each who considers that angina which has inflammation assails those who are healthy, flourishing and robust; the gangrenous, those who are invalids, weak, infirm, women rather than men, and children than both; that one without contagion strikes in spring; that with it, more in autumn.

Lues venerea, which sometimes attacks the throat with small ulcers, alone of other diseases may be mistaken for gangrenous angina, and the similarity between the two affections supports this error. If the patient talks much to the physician, as often occurs, he hides the true cause from him; the latter will consider that lues venerea has a minimum of inflammation of the throat; through this the ulceration proceeds more slowly, and the putrid fever always associated with the gangrenous angina is absent.

[47] After the month of February the disease so desists that no one is any longer bothered by it. H.C.D. Wilcke De angina infantum, p. 6.

Advice on Treatment

Whatever things ought to be done in treatment can be referred to some one of these things: first, that the oppressive indications be alleviated; then, that the sharp matter be gently expelled; then, that the strength of the patient be preserved; and finally, the remains of the disease removed. Of these common advices I shall consider the method so that I may follow the order of the affections as they display themselves, and thus I shall teach the remedies as proper for the physician attending the patient.

Therefore, with the onset of the disease, if the patient is nauseated or desires to vomit, it will be necessary that this desire be assisted for the sake of gentle vomiting, by an infusion of green tea, centaurea benedicta, matricaria (*flores Chammaemeli*), or a few grains of ipecac. For thus that suffering is best relieved, and anxiety and depression much alleviated. If after vomiting nausea, anxiety, and heaviness around the diaphragm remain, frequent potions of infused mint to which has been added a little port wine or that which is called Claret should be given, more or less according to the age and nature of the patient and the severity of the affections. Likewise, a saline draught may be given with a cardiac confection each hour on the second, third, or fourth day. If the bowel is obstinate, a liquor of milk, salt and sugar, or a common concoction may be introduced into it. On the other hand, if the bowel is overactive, although nausea and suffering have been relieved, one must resort to Campeche wood, electuary of scordium, the decoction of Fracastoro, of Fuller, or a powder composed of bole with or without opium,[48] and of strength according to the affections. One or another of these remedies, according to the different nature of the disease, ought to be employed. But none is nicer than the powder composed of bole with an admixture of a little cinnamon water; none more potent than the decoction of Fracastoro. So long as only the pharynx is inflamed, the vapors of vinegar, myrrh and honey, mixed hot, and given each third or fourth hour will be enough. But as soon as macules appear, Peruvian bark must be called into assistance. Of the various preparations of it none is more suitable for the sufferers, or more efficacious for health, than the decoction; for the various tinctures of the bark have less power; powders often display harmfulness for the stomach; of the extracts, there is danger of the strength being lessened while they are being prepared, and unless they are pre-

[48] Foth. Account, p. 56.

pared carefully, they do not possess all the strength of the medicine; the simple infusion has not yet been found to be beneficial in acute and dangerous diseases; small children who are unable to take the decoction often take the extract dissolved in a little cinnamon water. The vapors already mentioned must be introduced into the throat; furthermore, often on this day it ought to be washed with tincture of roses or a medicament composed of a pectoral decoction, and honey, vinegar, and tincture of myrrh should be gargled. The distinguished Fothergill considered that a medicinal gargle ought to be injected through a siphon,[49] which precept the outstanding Pringle greatly praised.[50] If the swelling of the glands is very painful, it is useful to rub them twice a day with a volatile liniment. Around this period of the disease, it is by no means rare for blood to burst forth from the nostrils, mouth, or uterus. If this flow weakens the patient and the pulse of the arteries, as it usually does, as soon as possible it must be stemmed by giving elixir of vitriol, or tinctura Japonica with Peruvian bark, and by introducing the vapors of vinegar into the suffering part or placing upon it a linen thread which has been soaked in vinegar.

If the beginnings of the disease have been neglected, the strength of the patient having been consumed, or the spirits downcast, there is much aid in alexipharmaca with Peruvian bark, of which sort are powdered contrayerva and Virginia snake root and liberal use of port wine. When the flow of the bowel lasts longer than usual, and those things passed through it more corrosive than usual, so that the anus and nates having been corroded, produce great distress for the patient, mild applications for the distressed part, or more often viscous liquors introduced into the bowel, usually greatly alleviate the evil.

Vesicants have been given in aid of depressed spirits, and for opposing or employment against faintness; on the other hand, Mercatus condemns their use,[51] and Ramazzini says "Vesicants seem more conducive to the estimation of the physician among the common people, lest anything had not been dared or attempted, than to the health of the sick."[52] If these things possess no common usefulness, perhaps they are beneficial for a soft swelling of the

49 Foth. Acc. p. 66.

50 Even in the angina maligna, or ulcerous sore throat, I lay chief stress of the cure upon gargling in this manner. In all cases I direct five or six syringe-fulls to be injected, one after another, as far into the throat as the patient can bear, and to repeat the medicine three times a day. Diseases of the army, p. 143.

51 Opera tom. 5. consult. 24. p. 142.

52 Constit. epidem. obs. 30. p. 113.

neck and the back of the neck, and ought to be applied across the throat.

From the beginning of the disease, the sufferer, as much as possible, ought to be kept in bed; for thus the troublesome heat of the skin is best tempered; the pores of the skin are kept open, and by a slight movement of the sweat profuse flow of the bowel is often blocked. Likewise, the bedroom ought to be airy, otherwise the patient will have to breathe in again and again the same putrid air, and those in attendance will be moving about in the greatest danger of the disease. His diet ought to be of sago, panade, broth in which either a fowl or beef has been boiled, whey separated out of milk by wine, and red wine diluted with hot water to which a roasted Seville orange is added. If, as is useful to many after the second or third day of the disease, the patient desires more sumptuous and savory foods and much undiluted wine, it should not be denied him. And always, before he swallows foods or medicaments, it must be seen that the mouth has been washed out, and that he has gargled and that through the whole course of the disease that he expectorates saliva rather than swallows it.

After the crusts have been separated, the ulcers healed, the fever dissipated, and the epidermis (*cuticula*) begun to peel, the bowel ought to be purged with rhubarb, and this ought to be done again several days later. If the swelling of the glands does not decrease, they ought to be rubbed with a mercurial ointment and a few grains of calomel given with rhubarb. Finally, some have a poor convalescence, aversion to food, dullness of mind, a hectic fever rising and falling, melting sweats. When this is the case, a rural region should be sought, ass's milk drunk and tincture of Peruvian bark, or the same decocted, and elixir of vitriol, should be employed.

Concerning Evacuations

To those things said above a few ought to be added on bloodletting and purgation of the bowel.

First, it is remarkable how much the force of opinion, contrary to the manifest testimony of the senses, removes men from the truth. For although it is not true that angina with inflammation may be better treated than by letting blood and purging the bowel, yet physicians discerning in gangrenous angina little difference from the other, after it had begun to rage through Europe, decided that it must be treated by the same remedies. And so they extracted blood, relaxed the bowel, and slew the sufferers! Nor

yet, while they attributed this either to the violence of the disease, or aid brought too late, or believed enough of the humors to have perished, did they desist from their sad beginning and persevered in the deadly error. Not only men of former times, but also those who were and are of our age, have followed the same manner of treatment with the same harmfulness to the many as well as those things even less worthy of pardon. These have been ignored because it is useless and unpleasant to name them, and I shall cross over to a more pleasant subject and indicate those who removed such abominable error from our minds. Joannes Weyer was among the first who dared to assert that "Venesections cause more damage than usefulness to the sick"; nor did he permit any humor to be led forth except from the veins under the tongue.[53] Mercatus, only on the first day of the disease, "before the fluxion contained in the parts enters putridity, he permitted the vein to be opened." These are his further words: "For then, if you bring forth blood, you will do great harm (which is the reason that many physicians seeing this damage, decline to let blood); because the strength is greatly dissipated, and you will extract nothing of that humor which has putrefied, nor by revulsion," &c.[54] The learned and intelligent Severinus proposes "to combat" this disease "in its irregularity, not its excesses of plenitude."[55] Yet the same one, considering treatment, so departed from authority that he permits six or eight ounces of blood to be withdrawn "in whatever way the patient may bear it," adding this caution, that he "does not desire, of course, dejection of the strength and native vigor."[56] The ingenious and thorough Ramazzini said "the results of venesection are so unfortunate that all the sick are terrified as often as bloodletting is proposed."[57] If we read Fothergill, Huxham, and Wall, we shall find that extraction of humors has no more beneficial results in England than on the Continent. From all these it is clear that bloodletting and purgation of the bowel are often harmful and rarely beneficial.

Wherefore the correct conclusion seems to me to be that purgation of the bowel at the beginning of gangrenous angina is entirely unsuitable, and bloodletting is beneficial only in those in whom, at the beginning of the ailment, the swelling of the pharynx is so great that suffocation threatens; and even then only the veins under the tongue are to be opened.

[53] Opera, p. 912.
[54] Opera, tom. 5. p. 138.
[55] De recond. abscess. natur. p. 539.
[56] Idem, p. 542.
[57] Const. epidem. p. 112.

DISSERTATIO MEDICA, INAUGURALIS,

DE

ANGINA GANGRAENOSA:

QUAM

ANNUENTE SUMMO NUMINE,

Ex Auctoritate Reverendi admodum Viri,

GULIELMI ROBERTSON, S. S. T. P.

ACADEMIÆ EDINBURGENÆ PRÆFECTI;

NEC NON

Amplissimi SENATUS ACADEMICI consensu,

Et nobilissimæ FACULTATIS MEDICÆ decreto;

PRO GRADU DOCTORIS,

SUMMISQUE IN MEDICINA HONORIBUS ET PRIVILEGIIS RITE ET LEGITIME CONSEQUENDIS;

Eruditorum examini subjicit

GULIELMUS WITHERING,
ANGLO-BRITANNUS.

Ad diem 31 Julii, hora locoque solitis.

———————*grave pectus anhelat,*
Caligant oculi,———————
Deficiunt vires, vox ægre faucibus exit.
ANTI-LUCRET. lib. v.

EDINBURGI:
Apud AULD et SMELLIE Typographos.

M, DCC, LXVI.

AVUNCULO MEO PLURIMUM HONORANDO,

VIRO VERE ERUDITO,

ARTIBUS INGENUIS ORNATISSIMO,

BROOKE HECTOR,

LICHFIELDIENSI, M. D.

PROPTER ANIMUM AMICISSIMUM,

QUO ME MEAQUE STUDIA

SEMPER FOVIT;

HEC NON,

REVERENDO ADMODUM VIRO,

HENRICO WOOD,

LITERARUM HUMANIORUM CULTORI,

PRÆCEPTORI FIDELISSIMO,

ANNORUM PUERILIUM CUSTODI SEDULISSIMO,

MONITORI LIBERRIMO ET AMICISSIMO,

OB OPTIMA

IN STUDIIS EXCOLENDIS CONSILIA,

BENEFICIAQUE INNUMERA IN ME COLLATA,

HANC DISSERTATIONEM MEDICAM,

GRATI ANIMI MONUMENTUM,

DICATAM VOLO.

HEC NON,

GULIELMUS WITHERING.

DISSERTATIO MEDICA

DE

ANGINA GANGRÆNOSA.

EX variis anginae quae memoriae proditae ſunt ſpeciebus, nulla auxilio medicinae magis indiget, quam ea de qua paucis differere mihi in animo eſt. Quod negotii eo lubentius ſuſcipiendum putavi, quod hoc malum majoribus noſtris omnino fere incognitum, memoria noſtra, atque etiam paucos ante annos, in compluribus Britanniae regionibus, incidens, priuſquam a FOTHERGILL, et poſt hunc ab HUXHAM, praeclariſſimis viris, ejus natura explicata eſt; ſive errantibus ſive animum parum intendentibus medicis, miſerorum aegrotantium pleroſque jugulavit.

ARETÆUS, vetuſtiſſimus de hoc morbo ſcriptor, eum Egyptiaca et Syriaca ulcera adpellavit*. Poſteri alia ei nomina alii dederunt; quorum haec praecipua ſunt:—*Cruſtoſa et peſtilentia tonſillarum ulcera*†; *Ulcera peſtifera in tonſillis*‡; *Angina epidemia, peſtifera, maligna,*

* Aretaeus Cap. De cauſis et ſignis morb. c. 9. p. 7.

† Aetius tetr 2. ſermo 4. cap. 46. p 397.

‡ Paulus Ægineta De re med. lib. 3. cap. 26. p. 445.

contagioſa *; *Faucium et gutturis anginoſa et lethalia ulcera* †; *Angina peſtilens* ‡; *Garrotillo* ‖; *Angina puerorum epidemica* §; *Angina epidemica Neapolitana* **; *Febris peticularis* ††; *Affectus ſuffocatorius, Carbunculus anginoſus, Phlegmone anginoſa, Morbus gulae, peſtilens ac praefocans pueros abſceſſus, Tonſillae peſtilentes, Aphthae malignae, Paſſio anginoſa, Laqueus gutturis, Epidemica gutturis lues* ‡‡; *Angina gangraenoſa* ‖‖; *Sore throat attended with ulcers* §§; *Malignant ulcerous ſore throat* ǂ; *Pelham ſore throat*; *Angina caricnomatica* ǂǂ: Quae nomina, quantumvis varia, eundem morbum omnia ſignificant. Licet enim in quibuſdam rebus differre videantur; tamen ea diſcrimina potius variae coeli naturae, vario victûs generi, variis hominum opinionibus

* Petri Foreſti Obſervat. med. 2 ſcholia, p. 190.

† D. Ludov. Mercati oper. tom. 5. conſult. 24. p. 134.

‡ Joannis Wieri opera, p. 910.

‖ Zacutus Luſitanus De praxi medica admiranda, lib 1. obſerv. 92. p. 73.

§ Libello Thomae Bartholini De ang pueror.

** Thomae Bartholini Epiſt. med cent. 1. p. 340.

†† Bernard. Ramaz. Conſtit. epidem obſ. 17. p. 110.

‡‡ Corteſii miſcellanea medica, 696. Severin. et Moreau Epiſt. ad Th. Barth. De laryng.

‖‖ Mead's Monita medica.

§§ Fothergill's account, &c.

ǂ Huxham's Diſſertation.

ǂǂ Nova acta eruditorum, anno 1758.

nionibus et loquendi generibus, quam ipſi morbi naturae, ſiquidem praecipua ſigna eadem ſemper ſunt, deberi credendum eſt.

DEFINITIO.

Licet nihil in artibus, nihil in ulla diſciplinae literarum parte, optabilius ſit, quam ut is, qui ullam rem cognitione dignam literis proditurus eſt, eam paucis verbis finire, et quae ſit ejus natura, in operis limine, aliis patefacere, poſſit; tamen praeſens noſtra ſcientia adeo dum incerta, adeo nondum abſoluta eſt, ut hoc ipſum definire ſemper factu difficile, ſaepe fieri omnino nequeat: idque, prae caeteris, arti medicinae uſu venit; cujus peritiſſimi et graviſſimi autores et profeſſores arduum hoc negotii ſaepe ne tentare quidem audent; nedum ego rei tam difficilis proſperos ſucceſſus mihi datum iri ſperem. Quocirca, utut neceſſarium eſt morbos inter ſe certis notis et diſcriminibus diſſepire; tamen, ſi hunc morbum "Inflammationem faucium cruſtis, "plerumque etiam ulceribus, et febre contagioſa putrida, comitantibus" definiens erraverim, non dubito quin veniam mihi dederint lectores.

HISTORIA

HISTORIA MORBI.

Angina gangraenoſa fere ante meridiem accedit; ab inertia et capitis veluti vertigine, qualis animae defectioni praeire ſolet, incipiens; cui deinde frigoris aliquantulum et horrores ſuccedunt, in magnum mox calorem deſituri; itaque ſaepe frigus et calor alternis vicibus aliquot horas ſubeunt, atque tandem vincit calor. Dolor acutus capitis, et in nonnullis graviter affectis tergi et artuum ſentitur. Plenitudinis et aegritudinis quiddam, magis quam dolor gutturis percipitur. Tuſſit aliquantum homo, aliquantum rigeſcit; muſculiſque cervicum et humerorum motitatis, dolet; inquietudinem, inenarrabilem anxietatem, animae defectionem, circa praecordia pondus et ſuſpiria frequentia, conqueritur. Nauſea, vomitus, dejectiones frequentes, torquent: vomitus autem et dejectiones pueros ſaepius, hoſque ſaepe ſimul, petunt. Pleriſque vultus rubeſcit et tumeſcit, nonnullis idem palleſcit, et attenuatur. Oculi hebetes, ſubrubri, et quaſi flentes, apparent. Paucis poſt morbi adventum horis, et in nonnullis protinus ab initio, uvulae et tonſillae tumidae et inflammatae conſpiciuntur. Quae partes, ſicut et velum pendulum palati, gena utraque

traque prope faucium introitum, quin et pharinx averſa, admodum rubent, vel potius coccinei coloris ſunt. Per uvulam, tonſillas, velum pendulum palati, et pharinga averſam, complures ſubalbidae ſeu cinereae maculae diſponuntur, quarum admodum contigui limites rubent. Hae maculae ſaepe et numero et magnitudine multum augentur, et in aliis hominibus aliae ſunt, ſive numerum, ſive magnitudinem, ſeu denique ſitum earum, reſpicias. Glandulae parotides et maxillarum multum tument, durefcunt, tactuque dolent. Vultus, collum, pectus, brachia, manuſque, eryſipelatis colorem magis aut minus plerumque referunt, et tumeſcunt. Per eadem loca exiguae lentigines rubentiſſimae apparent; quo facto, protinus nauſea fere deſinit, vomituſque et fuſa alvus ſiniuntur. Lingua ſumma albeſcit et humeſcit; eandem poſteriorem craſſa flaveſcens vel ſubfuſca cruſta obducit. Non multum ſitis eſt; ſed putentem in gutture et naribus odorem homo queritur; reque vera adſtantibus ſpiritus eſt moleſtus. Nares interiores alte rubeſcunt, vel prope liveſcunt; quin et ſanguis ex naribus ſaepiſſime, ex ore, et mulieribus ex utero, haud raro erumpit. Facilius tamen devoratur quam inſpecto gutture crederes, firmaque indolentius quam humores per guttur deſcendunt.

dunt. Cutis ardet, aret, exaſperatur, raro ſudore diducitur. Circa initia urina palleſcit, et ſerum lactis repraeſentat, quae utique in multis adultis hominibus exigua copia et alti coloris exit. Arteriae plurimis exiguae, citae, trepidant; eaedem nonnullis graves et quaſi undarum more fluctuant. Sanguis nitentis et rubentis coloris, ejuſdem pars craſſa diſſoluta, ſerum flavens et multum eſt. Febrilia ſub noctem multum ingraveſcunt, nonnulloſque prima nocte delirium agit. Sub lucem ſudor erumpit, et levaminis aliquid adfert: hoc autem toto morbo fieri conſuevit.

Procedente morbo, inquietudo et anxietas, cum devorandi difficultate, multum augentur. Alii enim pervigilant et phrenitide aſſidua torquentur: alii ſtupentes ita jacent, ut ſubinde ſubſilientes ſecum aliquid muſſitent. Alvo, quae fuſa erat, jam repreſſa, raro ea quicquam redditur; quae tamen ſi magna morbi ſaevities eſt, nonnullis ad extremum fuſa permanet. Vultus tumens, flaveſcens, et ſuffulgens; cervices admodum tumidae et oedematodes; oculi vividam gratiam perdidiſſe, ac vitreorum quaſi et emortuorum inſtar eſſe, adparent. Gutturis cruſtae, et numero et magnitudine creſcentes, concurrunt, et magnam unam atri fuſci coloris efficiunt: Quin

Quin et partes circumjacentes magis jam liveſcunt. Multorum cutis petechiis, et maculis purpureis obducitur. Jam ſpiritus peſſimus, et intolerabilis odor eſt. Tenuis ſanies ex ore et naribus effluit, acriſque ita, ut partes quas tangit rodat, et in veſiculas vultum, manus, et brachia aegrotantis, ſed et nutricis, excitat. Pueris ſternutamenta, fuſa alvus, tormina, inanis deſidendi cupiditas, nateſque et anus roſus, incidunt. Porro purulentae materiae, in aliis ſanguine tinctae, in aliis prorſus liventis et teterrime olentis, magna copia expuitur. Hoc tempore ſpiritus multo difficilior eſt, ſtridulus ſtertor eſt, vox rauca imo quaſi pectore effertur; urina coloratior, quaſi bile mixta, flaveſcit. Arteriae celerrime et tenuiter micantes trepidant; in nonnullis ictus intermittunt, omnique modo inaequales ſunt.

In natu minoribus quinque vel ſex dierum ſpatio morbus fere finitur: puberes, quive hanc aetatem ſuperarunt, ſecundo vel tertio die aliquando moriuntur; nonnulli autem in decimum vel duodecimum diem vitam miſeram trahunt.

Inſpectio Cadaverum.

Cadavera incidendi et ſcrutandi negotium, quod ad morborum naturam retegendam plurimum facit, nunquam ſuſpecta in lucem

lucem profert, cauſarum notitiam illuſtrat, et rationes ac contemplationes noſtras in ſolidiore monumento ponit, hactenus nimis eſt neglectum. Atque nunc etiam, licet multa tentata ſint, tamen plura tentanda ac inveſtiganda reſtant. Quodque ad hunc morbum attinet, diligentiam omnium cadaverum receſſus explorandi et acre MORGAGNI ingenium deeſſe, dolendum eſt.

QUONIAM igitur publica deſunt, privata quaedam ab ingenioſiſſimo, doctiſſimo, maximeque amabili juvene, amico meo NOOTH, qui mecum medicinae lauream petit, accepta, duobus cadaveribus inciſis obſervata, exponam.

MULIER quaedam trimeſtri ſpatio poſt partum, in anginam gangraenoſam implicita eſt; quo morbo procedente, exanthemata pectore apparebant; alvus limoſa quaedam cum torminibus reddebat; ipſa octavo die peremta eſt. Cadavere aperto, membrana fauces et ſuperiorem oeſophagi partem intus obducens, multo craſſior juſto, cruſtiſque fulvi coloris conſita reperiebatur; quibus facile ſeparatis, partes ſubjectae roſae, tanquam inde aliquid periiſſet, apparebant. Rubedinem, quae vivarum fuit, fauces perdiderant. Craſſior ſolito magiſque rubra interior laryngis membrana erat. Ventriculus et inteſtina materiam limoſam continebant.

nebant. Circa guttur glandulae lymphaticae ampliatae erant; ſalivae autem ſub lingua glandulae minime affectae videbantur. Glandula quaedam lymphatica protinus ſupra ipſum parotidis additamentum ſita, magnopere; ipſa vero parotis glandula minime tumeſcebat. Hinc tumores, qui a parotidum et ſalivae in maxillis glandularum affectibus orti crediti ſunt, revera glandularum lymphaticarum eſſe; quodque acrem ex ulceribus faucium materiem hae imbiberint ideo effectos; et ſalivae glandulas ſolum ex reliquis partibus tumefactis deinde affici, veriſimillimum eſt. Ad ſupra dicta adtexendum videtur, huic mulieri ſanguinis unciis quatuordecim detractis, arterias multo debilius micuiſſe, robur prorſus fractum eſſe, ipſamque ad priſtinas vires et valetudinem, auxiliis aliter ſecundiſſimis adhibitis, nunquam deinde reduci potuiſſe.

IDEM juvenis, pueri annos quinque nati, hoc morbo perempti, cadavere ſcrutato, membranam fauces intus obducentem multo ſpiſſatiorem, non incruſtatam, ſed ulceribus maculiſque liventibus, per magnam oeſophagi partem ſerpentibus, conſitam, laryngem a morbo liberam, pituitoſam naſi membranam memorabiliter tumefactam, conſpexit. Hic puer vivus,

exanthematibus caruerat; ſed alvo ſoluta, per totum morbi tempus, erat exercitus.

IN quibuſdam a praeclaro noſtro MONRO Patre, cadaveribus inciſis, interior laryngis pars tali tunica, qualis in ſuffocatione ſtridula eſt, obvoluta reperta eſt. Quod utique in omnibus non factum eſt, et quorum cadavera ſic afficiebantur, ii vivi ſuffocatione ſtridula affectorum inſtar, per morbi tempus ſpiraverant *.

FIERIQUE etiam poteſt, ut angina gangraenoſa et ſuffocatio ſtridula eundem ſimul petant;

* "Subjungere vero omnino oportet, quae in demortuo, eodem illo tempore, quo Stockholmiae graſſabatur, reperit Celeb. Anat. et Chir. Profeſſor Rolandus Martin. Praeſentibus R. Coll. Med. aſſeſſoribus graviſſimis, experientiſſ. D D. D D. Strandberg et Darelio, infantem, qui hoc morbo deceſſerat, diſſecuit. Aſperam Arteriam intus undique membrana craſſiori induſtam obſervavit. Griſea illa inventa eſt, et ex putredine lacinioſa, parte qua parietibus tubi adhaerebat; altera exteriore ſanguineo-purpurea. In bronchiis pulmone tectis cartilagines luculentas in illa effecerat impreſſiones. Quo longius autem deſcendebat, eo pallidioris fuit ruboris, et in ſubtiliſſimis quidem bronchiorum ramis prorſus albicans, ſpeciem praebuit membranae, quae putamen ovi intus inveſtit; quacunque vero ſe extendebat, evidenter a membrana bronchiis propria diſtingui potuit. Pulmones non fuerunt inflammati, neque ulla ratione laeſi, ut ſuffocatione infantem periiſſe conſtaret."

Vid. Diſſ. med. inaug. de Angina Infantum, H. C. D. Wilcke. p. 6.

tant; eoque magis, quod ingeniosus WHYTT, qui medicinam nuper in hac academia docuit, praeter suffocationem stridulam cum inflammatione, aliam ejusdem morbi speciem, quam ille putridam malignam nuncupavit, simul incidere demonstravit *. Quae utique species in meridionalibus Britanniae partibus vix unquam conjunguntur; acutum enim latrantem illum sonitum, qui in angina cum inflammatione saepe auditur, HUXHAM ne semel quidem in angina gangraenosa sese percepisse testatur †.

De Exanthematibus.

SECUNDO fere, tertiove morbi die, magna pustularum vis, quas ἐξανθήματα Graeci vocant, per summa corporis oritur. Cervices, collum, pectus, brachia, et manus, coloris erysipelatodis sunt, tumorisque plus minusve habent, perque has partes plurimae papulae, exiguae, magis rubrae quam partes circumjacentes, dispergunturEaedem et in iis hominibus, et in iis eorundem partibus, ubi rubedinis minus est, majores existunt ‡. In aliis multum eminent; in aliis adeo parvae sunt, ut tactu quam visu magis sentiantur. Si tumor magnus est, brachia,

* In Praelectionibus clinicis.

† Huxh. diss. p. 280.

‡ Foth. acc. p. 33.

chia, manus, et digiti rigescunt, et aliquantum dolent *.

RUBEDO et exanthemata summae cutis, non tam anginae gangraenosae hoc tempore, quam cum illa primum apud nos apparuit, constanter adhaerent †. Nonnullis enim, ante anginam, cutem exanthemata distinguunt: alios vero, prae caeteris adultos homines, sine exanthematibus gravissima angina premit, quos deinde convalescentes, magnus pruritus, cuticulaeque abscessus, afficiunt ‡.

HUJUS morbi pustulae, cum eum RAMAZZINUS primum observavit, adeo erant insignes, ut febrem peticularem inde ille vocaverit. Illoque auctore discere licet, earundem faciem, aeque ac nunc, conspectu variam fuisse ‖. Quin et easdem saepe in Italia ex toto abfuisse, eo verisimile est, quod scriptorum Italorum complures nullam earum mentionem fecerint.

PROG-

* Huxh. diss. p. 282.

† Dr Wall's letter. Gent. Mag. 1751. p. 499.

‡ Huxh. diss. p. 281.

‖ Variae autem ac diversi coloris erant, prout varii ac diversi erant aegrotantium habitus; aliae erant rubrae, aliae pallidae, aliae fusci coloris; aliae parvae, aliae latae, aliae in summo, aliae in profundo, et quas non nisi oculis tranverse tuentibus liceret inspicere, quod genus peticularum fuit valde ominosum.

Bern. Ramazz. constit. epidem. obs. 19. p. 111.

PROGNOSIS.

POST primum usque morbi diem, nonnulli convalescunt; in plerisque tertio, quarto, quintove demum die, haec signa salutis apparent: Immodica animae defectio remittit, quod ipsum faustum omen est; rubedo cutis summae paulatim decedit; calor minuitur; lenis facilis sudor per omnia aequaliter membra exit; arteriae lentius, validius, et aequaliter magis micant; spiritus mollior et expeditior fit; aliquid gratiae vividae et constantiae ad oculos redit *; faucium crustae leniter et mansuete abscedunt; ulcera munda, florida, in carnem ire videntur; mollis colli tumor decrescit; somnus non turbatur, vigilia tranquilla est, cibique desiderium redit. Urina turbida est, in eaque aliquid farinae instar desidit. Alvi profusio paulo maturius definit. Alii multum pectore, alii minimum aut nihil exspuunt. Exanthemata cito et mature prodeuntia, plerumque laetum finem promittunt; magisque, si cuticula ample abscedens sequitur.

CONTRA, rigor superveniens, exanthemata vel subito evanescentia, vel in fuscum et lividum

* Aetius Cletus Signinus de morb. strangulat. cap. 1. p. 6.

dum colorem converſa; arteriarum pulſus admodum exigui, citi, trepidi, omnique ex parte inaequales; cutis cum ariditate ardor; ſpiritus difficilior; anxietas permanens; fauces rubentiſſimae, prope liveſcentes, et cum ſplendore quodam areſcentes; afflictum in ſummo periculo verſari ſignificant. Verum oculi hebetes et opaci; urina pallida ac limpida, phrenitis aut coma, cum frigidiuſculo vultus et extremorum ſudore, ſubiens; ſingultus aut ſuffocationis periculum; et huic propria convulſio quaedam gutturis muſculorum; ſubito ſoluta alvus, liquidam foede olentem materiam, neſcio homine, profundens; cervices, collum, vultuſque, quaſi inflata, turgeſcentia, et cadaveris inſtar apparentia, et totum corpus molliter tumeſcens; mortem eſſe in propinquo declarant.

Puerilis aetas plerumque plus in hoc morbo quam adultior patitur: Nam praeterquam quod idonea iis remedia ſubminiſtrari nequeunt; quia acria et cruſtas a gutture ſubinde abſcedentes, exſcreare neſciunt, et haec devorata ventriculum et inteſtina rodunt; ideo totius corporis aegritudo, tormina, inflammatio, gangraena, ſanguinea limoſa magnopere rodentia ac foediſſime olentia alvo reddita, miſerrimos exercent.

CAUSÆ

CAUSÆ PRÆDISPONENTES.

Homines qui laxos et humidos habitus habent, angina gangraenoſa magis quam alii *, pueri quam natu grandiores †, puellae quam pueri, mulieres quam viri, alios morbos paſſi ſoliti quam robuſti et integri ‡, periclitantur.

Porro, quaecunque corpus debilitant, idem huic morbo objiciunt; hujuſmodi moeror §, humores immodice excreti **, et ſimilia quaedam, ſunt. Quae vero, praeter firma debilitata, humores acri putredine afficiunt, ea demum potentiſſima ad morbum ſunt: hujus autem generis febres putridae ††, variolae ‡‡, ſcorbutus, dyſenteria §§, ſunt. Poſtremo, angina cum inflammatione viam ad anginam gangraenoſam interdum facit. Nuper enim, ab omnibus fere illius ſignis incipiens morbus, intra biduum vel triduum natura mutata, in hanc

* Severinus De recondita natura abſceſſ. p. 547.

† Aetius Cletus Signinus de morbo ſtrangulatorio, cap. 1. p. 6.

‡ Foth. diſſ. p. 49. Aetii Tetr. 2. Sermo. 4. p. 398.

§ Idem. p. 43.

** Idem.

†† De Wall's letter. Gent. Mag. Ann. 1751. p. 501.

‡‡ Idem.

§§ Van Swieten comment. § 811. p. 683.

hanc manifeſto definere, haud raro obſervatus eſt.

CAUSAE OCCASIONALES.

Praecipuae cauſae morbum protinus excitantes, a ſcriptoribus commemoratae, ſunt coelum humidum et aeſtuans *, venti auſtrales †, locorumque humiditas ‡. Hae autem duplice ratione forſitan agunt; nam et cum cauſis ſupra dictis conjungi, et morbum efficere; vel diu manentes, et corpus male afficientes, hoc tandem opportunum morbo reddere poſſunt. Cum autem de hac actione ſupra jam dixerim, nunc de illa ſola dicam. Aretaeus, cum Ægyptios, prae caeteris §, angina gangraenoſa tentare videret, quod radicibus, oleribus, et ſeminibus acribus veſcerentur, et aquam ex Nilo potandam peterent, id fieri conjecit. Neque hanc conjecturam ex toto

* Van Swiet. comment. § 811. p. 683.—Aer humidus, calidus, maxime ad putrefactionem facit, quod etiam de corporibus humidis calidis (qualia ſunt infantilia) intelligendum, quorum temperies prae omnibus putrefactioni eſt obnoxia. Becher. Phyſica ſubterranea, l. 1. § 5.

† Huxh. diſſ. p. 273. Foth. acc. p. 31.

‡ Aret. Capp. cap. 9. p. 7. Gent. mag. loco ſupra citat.

§ De cauſis et ſignis morborum, cap. 9. p. 7.

toto inficior; verum, ni fallor, ratio multo veriſimilior ex proprio regionis ſitu, Nili inundationibus patentis, ideoque incolas vaporibus inde ſummiſſis, et coeli iſtius ardore, flumine alveum repetente, putentibus objicientis, trahenda eſt. Ille ſiccum aëra pro cauſa habuit, quem virum optime de medicinae cultoribus meritum, ac imprimis diligentem, tamen in errorem ſemel incidiſſe opinor: Neque enim tam ardentis coeli aëra, tota terrae facie aquis toties et tamdiu ſtagnante, areſcere poſſe, credendum eſt.

CAUSA PROXIMA.

Omnibus quae in hoc morbo apparent perſpectis, viro praeclaro Fothergill, proximam ejus cauſam putridum virus, ſeu, ut ille loquitur, "ſui generis miaſma," eſſe, aſſentio. Verum hoccine morbi ſemen cauſarum antecedentium actione conjuncta intus naſcatur, an ex aliis corporibus ad alia tactu, aliquave re media, perferatur, quaeſtio inveſtigatu difficilis eſt. De qua pauca dicam, ubi prius, quod ſcitu multo erit dignius, gangraenoſa angina contagioſa ſit necne, inquiſivero. Et quoniam in diligentibus ac fidelibus obſervationibus res poſita eſt, eorum qui in ea obſervanda verſati

ſunt teſtimonia in unum conferam. Severinus "Quod ad *contagionem*," inquit *, "attinet, hoc tum communi omnium conſenſu, "atque experimento, evincitur, tum etiam "comprobatur ratione." Zacutus Lusitanus, "In his partibus," ait, (ſcilicet faucibus) "ex humoris virulenti affluxu gignuntur carbunculoſae inflammationes, quae, peſtis dirae, aut veneni promptiſſimi inſtar, *contagio* "quodam pueros et adultos corripiunt, et "ſaevis maleficentiſſimis ſtipatae ſymptomatis "citiſſimam necem inferre ſolent †." Moreau haec verba ſunt: "Qui fere in diverſas ſemitas abeunt, uno articulo concordes, pernicioſum videlicet affectum et epidemicum, et "*contagioſum* eſſe ‡." Wedelius "Anginam "infantilem *contagioſam* eſſe" definit ‖. Quod ſi ad haec Fothergill § et Wall ** teſtimonia adtexantur, anginam gangraenoſam eſſe contagioſam, haud erit addubitandum.

Altera quaeſtio eodem modo inveſtiganda

* De recondita abſceſſuum natura, p. 530.

† Zacut. Luſitan. De prax. med. admir. lib. 1. obſ. 92. p. 73.

‡ Epiſt. R. Moreau ad calcem tractatuli Thom. Barth. de Angina pueror. epidem. p. 128.

‖ Wedelius De morbis infantum, cap. 20. p. 77.

§ Foth. Acc. p 71.

** Gent. Mag. ann. 1751, p. 497.

da reſtat: tactune, an alia re media interpoſita, ex aliis ad alia corpora hic morbus transferatur? harum rerum utramvis fieri poſſe, Mercatus auctor eſt, cujus teſtimonium infra ſcriptum eſt: "Mirabile dictu! erat quidem dira humoris conditio, adeo pernicioſa, efficax, et contagioſa, quod digitum patris indicem, quo extrahebat eum ſuccum "ex ore filii, mordicaret et in ruborem moveret cum dolore: tandem mox pater conquerebatur de difficultate reſpirandi et deglutiendi, cum dolore et tumore faucium, "ac faturato colore et glandulis extra appa"rentibus juxta mentum. Ex quibus ſecundo die halitum prave olentem expirabat; "ita ut jure optimo poſſis colligere, contagio "filii patrem fuiſſe affectum *."

Qui autem hoc morbo laborantis ſpiritum modo perſenſerit, ei contagionem per aëra in vicina corpora inſinuari poſſe, certe erit fatendum. Porro Cl. Fothergill, eundem morbum in familia exortum, niſi ab aegris integri ſemoveantur, per omnes parvulos ire; atque etiam ex adulta aetate qui multum inter eos verſantur, et vicini ſpiritus halitum excipiunt, paucos labis aliquantum fugere, teſtatus eſt. Idem, eam rem, quod "putridum virus ſive "ſui

* Opera, tom. 5. conſultat. 24. p. 139.

" ſui generis miaſma" per contagionem in corpus permanaverit, fieri judicavit.

DIAGNOSIS.

Cum qualis ſit angina gangraenoſa jam ante definiverim, eandem ab aliis morbis quae diſtinguant, quod Graeci διαγνωσιν dicunt, diſcrimina quaedam exponere, ſupervacaneum videri poſſit. Verum, licet definitio breviter idem faciat, tamen ad propria quaedam deſcendere, et morbus de quo agis quibus rebus ab aliis ei vicinis differat, quibus conveniat, fuſius percurrere, ſaepe operae pretium eſt. Ut igitur tria mala huic ſimilia ſunt, aphthae, angina in inflammatione poſita, et lues venerea; nonnullas notas, quibus ab angina gangraenoſa internoſcantur, ordine demonſtrabo. Nulla noxa anginae gangraenoſae ſimilior fauces infeſtat, quam aphthae; utramque enim cauſae communes excitant, utrique affectus plurimi ſunt communes, medendique ratio non diſſimillima eſt. Diſcrimina vero haec ſunt: Ulcera anginae gangraenoſae, pharynge, amygdalis, velo pendulo palati et uvula, continentur: Contra, aphthae, non ſolum fauces, oeſophagum, hiſque proxima afficiunt, ſed et

et genas interiores, gingivas, palatum, et linguam obſident *. Ulcera illius in latitudinem ſerpunt, et figuris inaequalibus ſunt; hae parvae ac rotundae apparent †, et interdum febre carent; contra, angina gangraenoſa ſemper febrem habet ‡. Eadem contagioſa eſt; aphthae contagionis expertes: illa eryſipelas colore magis aut minus refert; in his nullus talis color obſervatur. Plura diſcrimina, ſi pluribus eſſet opus, in medium proferri poſſent.

Porro, cum plurimum referat, anginam gangraenoſam ab illa quae cum inflammatione eſt, ab ipſo initio dignoſcere; ea ſigna, in quibus quicquid differentiae ſit, colligere et commonſtrare conabor. Utriuſque primae acceſſioni communis horror, qui a multis horripilatio perperam dicitur, reperitur; idem, in angina gangraenoſa, vices cum calore ſubito permutat. Eidem huic ſumma anxietas, animae defectio, circa praecordia gravitas, ſuſpiria, inſueta laſſitudo, animique dejecti, propria ſunt. In angina cum inflammatione, arteriae crebro, plene, et valide; in gangraenoſa item crebro, ſed exiliter et inaequaliter, micant. Illius tumor faucium magnus eſt, et inflammationi

* Boerhaavii Aphoriſm. § 981.
† Idem, § 979.
‡ Van Swiet, Comment. § 983. p. 201.

tioni phlegmonicae concolor; hujus tumor tardius creſcit, et coloris admodum coccinei eſt; quae ipſa nota adeo eſt inſignis, ut qui ſemel anginam gangraenoſam viderit, vix eam deinde viſam neſcire poſſit. Angina in inflammatione poſita faucium dolorem acutum et pulſantem habet; in gangraenoſa, non tam dolor, quam calor et aegritudo quaedam, ſentitur. Haec, ſaepe a vomitu et dejectionibus crebris, illa nunquam, incipit. Denique, ubi ulcera jam apparent, tum demum de morbi natura, ſatis manifeſta, amplius dubitari nequit. Verum ſemper prius os et guttur gargarizandum eſt, quam ea medicus inſpiciat; quod ubi non erat factum, mucum amygdalas et columellas obtegentem, pro ulceris cruſta habitum, ipſe vidi. Poſtremo, ſi quis, anginam quae inflammationem habet, bene valentes, vigentes, et robuſtos; gangraenoſam, valetudinarios, imbecillos, et infirmos, mulieres potius quam viros, pueros quam utroſvis, petere; illam ſine contagione, vernis; hanc cum ea, autumnalibus magis temporibus, incidere conſideret *; is ab omni parte utriuſque diſcrimina tenebit.

Lues

* Poſt menſem Februarium morbus ita deſiit, ut ne ullus quidem eodem laboraret amplius. H. C. D. Wilcke De angina infantum, p. 6.

Lues venerea, quae cum ulcuſculis guttur interdum obſidet, ſola aliorum morborum angina gangraenoſa credi poteſt; quem errorem, ſive cauſae ſive affectuum praecedentium notitia tollet. Quod ſi medico, quod ſaepe fit, verba dedit, eumque veram cauſam aegrotans celavit; ille luem veneream inflammationis gutturis minimum habere, per hoc exulcerationem tardius procedere, febremque putridam anginae gangraenoſae ſemper haerentem abeſſe, pro certo habeto.

MEDENDI CONSILIUM.

Quæcunquæ in curatione facienda ſunt, ad aliquid horum referri poterunt; primum, ut urgentia ſigna leventur; deinde, ut acris materia lenita ejiciatur; tum, ut robur affecti ſervetur; poſtremo, morbi reliquiae tollantur. Quorum communium conſiliorum ita rationem habebo, ut affectuum, prout ſeſe obtulerint, ordinem perſequar; itaque remedia praecipiam, ut aegrotanti medicum adſidentem decet.

Igitur, incipiente morbo, ſi nauſeat homo, aut vomere deſiderat, hoc deſiderium juvari, leniter vomendi cauſa, thea viridi infuſa, car-

duo

duo benedicto, chamaemeli floribus, vel ipecacoanae paucis granis datis, oportebit. Sic enim ea aegritudo optime ſolvitur, anxietaſque et animae defectio multum levantur. Quod ſi poſt vomitum, nauſea, anxietas, et circa praecordia gravitas, permanent, menthae infuſae cui vini Oportoenſis, ejuſve quod *Claret* dicitur, exiguum aliquid adjectum ſit, crebrae potiones, magis minuſve pro aetate, natura hominis, aut affectuum ſaevitia, dandae ſunt. Item hauſtum ſalinum, ſecunda, tertia, aut quarta quaque hora, cum confectione cardiaca, dari licebit. Si alvus dura eſt, liquor vel ex lacte, ſale, et ſaccharo, vel ex decocto communi, in eum immittatur. Contra, ſi alvus citatur, nauſeaque et aegritudine ſublatis, non ſiſtitur; ad decoctum lignum Campechenſe, electuarium e ſcordio, decoctum Fracaſtorii Fulleri, pulverem e bolo compoſitum, vel ſine vel cum opio *, pro affectuum vehementia, fugiendum eſt. Ex his remediis aliud alii, pro morbi natura varia, anteponendum eſt. Nullum vero pulvere e bolo compoſito, tenui aqua cinnamomi admixto, elegantius; nullum decocto Fracaſtorii potentius eſt. Quoad ſolum fauces inflammabuntur; vapores mixturae ex aceto, myrrha, et melle, compoſitae ferventis, tertia quaque vel quarta hora inſinuare

* Foth. Account, p. 56.

nuare ſatis erit. Verum ſimulac maculae apparuerunt, cortex Peruvianus in auxilium vocandus eſt. Inde, ex variis paratis, nullum vel aegrotantibus magis convenit, vel efficacius ad ſalutem, decocto eſt; nam variae tincturae corticis virtutis minus habent; pulveres ventriculo moleſtiam ſaepe exhibent; extractorum, dum parantur, vis imminui periclitatur, et niſi diligenter parantur, totam medicinae vim non poſſident; infuſum autem ſimplex nondum in acutis et periculoſis morbis prodeſſe compertum eſt; extractum in aqua cinnamomi tenuiori ſolutum, qui decoctum ſumere nequeunt, parvuli ſaepe ſument. Vapores modo memorati uſque in guttur inſinuandi ſunt; praeterea hoc ſaepe in die tinctura roſarum lavandum, vel medicamento ex decocto pectorali, melle, aceto, et tinctura myrrhae compoſito, gargarizandum eſt. Praeclarus Fothergill gargarizantem medicinam per ſyphonem injiciendam cenſet *; quod praeceptum Pringle egregius ſummopere collaudat †. Si glandularum tumores

D multum

* Foth. Acc. p. 66.

† Even in the angina maligna, or ulcerous ſore throat, I lay the chief ſtreſs of the cure upon gargling in this manner. In all caſes I direct five or ſix ſyringe-fulls to

be

multum dolent, linimento volatili bis die eas fricare, utile eſt. Circa hoc morbi tempus, ſanguinem ex naribus, ore, aut utero erumpere, haud rarum eſt. Cujus profluvium ſi hominem arteriarumque pulſus, ut fert conſuetudo, debilitat; id, elixir vitrioli acidum, vel tincturam Japonicam cum cortice Peruviano dando, in partem laborantem aceti vapores inſinuando, aut ſuper eam carptum linteum filum aceto tinctum imponendo, quamprimum ſiſtendum eſt.

Si morbi initia neglecta ſunt, robur hominis confectum, aut animi dejecti ſunt; in alexipharmacis cum cortice Peruviano, qualia pulvis contrayervae et radix ſerpentariae Virginienſis ſunt, ac libero vini Oportoenſis uſu, plurimum eſt auxilii. Ubi alvi profluvium ſolito diutius permanſit, quaeque per eam redduntur ſolito magis rodunt, ideoque anus et nates roſa, plurimam homini moleſtiam exhibent; id mali, mollientia partis laborantis fomenta, liquoreſve mucoſi ſaepius in alvum immiſſi, maxime levare ſolent.

Vesicantia in auxilium animae dejectionum, et delirio occurrendi aut ſuccurrendi cauſa,

be injected, one after another, as far into the throat as the patient can bear, and to repeat the medicine three times a-day. Diſeaſes of the army, p. 143.

cauſa, data ſunt; quorum utique uſum Mercatus damnat*; Ramazzinusque "Veſicantia," inquit, "magis medicorum exiſtimationi apud vulgus, ne quid inauſum, aut intentatum fuiſſet, conducere viſa ſunt, quam aegrotantium ſaluti†:" Quae quidem, ſi quam omnino utilitatem praeſtant, molli colli et cervicum tumori forſitan proſunt, et tranſverſo gutturi applicanda ſunt.

Ab ipſo morbi initio, aegrotans, quam maxime fieri poteſt, lecto continendus eſt; ſic enim moleſtus cutis ardor, optime temperatur; foramina cutis aperta ſervantur, et, ſudore modico moto, alvi profuſioni ſaepe occurritur. Item, cubiculum perflatum eſſe debet, aliter homo eundem aera putridum iterum iterumque cum ſpiritu trahere neceſſe habebit, ſummoque in morbi periculo etiam adſtantes verſabuntur. Victus ejus, ex ſago, panada, juſculo in quo vel pullus vel bubula decocta ſunt, ſero lactis vino ſeparato, vino rubro aqua quae igni ferbuerat diluto aurantio Sevillenſi aſſo adjecto, eſſe debet. Quod ſi, ut multis poſt alterum tertiumve morbi diem uſu venit, cibos lautiores et conditiores et vinum merax multum deſiderat, ea non erunt

* Opera, tom. 5. conſult. 24. p. 142.
† Conſtit. epidem. obſ. 30. p. 113.

runt neganda. Semperque, priuſquam vel cibos, vel medicamenta devoret, ut os abluatur, et gargarizetur, perque totum morbum ſaliva expuatur, non devoretur, videndum.

Post cruſta ſegregata, ulcera perſanata, febrem ſolutam, et cuticulam abſcedere coeptam, alvus rhabarbaro purganda, idemque poſt aliquot dies iterum faciendum eſt. Si glandularum tumor non decreſcit, eae unguento mercuriali perfricandae ſunt, et calomelanos grana pauca cum rhabarbaro danda. Nonnullos cibi faſtidium, animi hebetes, calor hecticus iens redienſque, colliquentes ſudores, convaleſcentes male habere perſtant: ubi hoc fit, coelum ruſticum petendum, lac aſininum bibendum, corticis Peruviani tinctura, aut idem decoctus, et elixir vitrioli utenda ſunt.

De Evacuationibus.

Supra dictis, pauca de ſanguine mittendo, et alvo purganda, adjicienda ſunt.

Imprimis, mirandum eſt quantum vis opinionis, contra manifeſtum ſenſuum teſtimonium, homines a vero abripiat: Cum enim non ſit, ut angina cum inflammatione, melius quam ſanguine detracto, et alvo purgata, curetur;

retur; idcirco, anginam quoque gangraenoſam, poſtquam graſſari per Europam coepit, medici parum ab altera diſcernentes, iiſdem remediis tollendam cenſuerunt: Itaque ſanguinem detraxerunt, alvum ſolverunt, aegrotantes jugularunt! Neque tamen, dum hoc vel ſaevitiei morbi, vel auxilio ſero adlato tribuebant, vel humorum ſatis non periiſſe credebant; ab incepto triſti deſtiterunt, et in funeſto errore perſeveraverunt. Nec ſoli ſuperioris ſaeculi viri, ſed et noſtra memoria qui fuerunt et ſunt, cum pari multorum pernicie, ſed his etiam minus venia digni, eundem medendi morem, ſecuti ſunt. Quibus, quia eos nominatim deſignare inutile et ingratum eſt, omiſſis, ad laetiorem rem tranſibo, quique tam foedum errorem noſtris animis detraxerunt, deinde monſtrabo. JOANNES WIERUS, inter primos "Venaeſectiones plus damni, "quam utilitatis aegris, attuliſſe," aſſerere auſus eſt; neque ullum humorem niſi ex venis ſub lingua educi paſſus eſt *. MERCATUS, ſolo primo morbi die, "antequam fluxio in par-"tibus contenta, ad putredinem commigra-"ret, venam ſecari ſivit." Hujus praeterea haec verba ſunt: "Nam tunc temporis, ſi ſan-"guinem fuderis, ſummopere laedes, (quae "cauſa fuit, quod multi medicorum, viſo "hoc

* Opera, p. 912.

"hoc damno, renuerint ſanguinem mittere); "quia vires maxime diſſipantur, et nihil ejus "ſucci qui computruit, extrahes, neque re-"vulſione *," &c. Doctus et intelligens SEVERINUS, hunc morbum "pugnare pravita-"te, non plenitudinis exceſſu," proponit †. Tamen idem curationem tractans, adeo auctoritate abripitur, ut quatuor, ſex, vel octo uncias ſanguinis detrahi, "aut eo demum modo "quem poſſit homo ferre," permittat; hanc cautelam interſerens, ſe "dejectum nempe vi-"rium et vigoris nativi nolle ‡." Ingenioſus et perelegans RAMAZZINUS "adeo improſpere "venaeſectionem ceſſiſſe, ut omnes aegri ex-"horreſcerent quoties ſanguinis miſſio per ve-"naeſectionem proponeretur ‖," dixit. Quod ſi FOTHERGILL, HUXHAM, et WALL perlegamus, humoris detractionem nihilo proſperius in Anglia quam in Continente ceſſiſſe, reperiemus. Siquidem inter hos omnes, ſanguinem miſſum, et alvi purgationem, ſaepe perniciei, raro ſaluti, eſſe conſtat.

Quo-

* Opera, tom. 5. p. 138.

† De recond. abſceſſ. natur. p. 539.

‡ Idem, p. 542.

‖ Conſt. epidem. p. 112.

QUOCIRCA, alvi purgationem circa anginae gangraenoſae initia, omnino alienum eſſe, et ſanguinis miſſionem iis ſolis prodeſſe, quibus, incipiente malo, faucium tumefactio tanta eſt, ut ſuffocationem minitetur; atque tum etiam venas ſub lingua ſolas eſſe ſecandas, recte concludere mihi videor.

FINIS.

Some Relations Between British and Danish Medicine in the Seventeenth and Eighteenth Centuries*

EDV. GOTFREDSEN**

IN the seventeenth century medicine was extremely international. Medical students travelled all over Europe to hear famous teachers, and Latin was the common language of all learned men. The students from small universities, such as the University of Copenhagen, were simply forced to acquire a part of their education abroad, because the small staffs of their own universities could not teach them everything. The physicians of the seventeenth century were men of universal learning. They did not cultivate medicine only, but also science and the humanities. By the original charter of Copenhagen University no one could take any degree in the faculty of medicine unless he had taken the Master of Arts degree in the faculty of philosophy. What a medical student had to learn in those days is apparent from a booklet published in 1628 by the Danish anatomist, Caspar Bartholin the Elder. The title of the booklet is: "Short and extemporary advice on how to begin, to continue, and to complete the study of medicine," and Bartholin discussed in it the various subjects which were to be studied and gave the titles of a whole library of books to be read.[1]

"Least of all," Bartholin says, "may you rush into the sacred places of the physicians with impure hands, as the saying is, but an accurate and by no means superficial knowledge of the Latin and Greek tongues, to which the particular doctrines of that art are consigned, must be postulated. For what will you learn from others or at length explain to others in your teaching if you are not sufficiently instructed in Latin? How will you judge whether the words of Hippokrates and Galen are written well or badly if you are ignorant of the Greek idioms?"

Furthermore, Bartholin recommends the study of rhetoric and logic, while he does not consider metaphysics of any value to the

* An address delivered at the Wellcome Historical Medical Museum, London, on 19 October 1951, in opening the exhibition illustrating *British Medicine and the Continent 1600-1850*.

** Copenhagen, Denmark.

1 Bartholin, Caspar. *De studio medico inchoando, continuando et absolvendo consilium breve*. Hafniae, 1628. Republished in Thomas Bartholin, *Cista medica Hafniensis*, Hafniae, 1662, p. 257.

future physician. He adds, however, that they who possess a clever and acute mind and time in abundance may take in the main branches of that subject, especially if they want to become professors in the University.

As for science he recommends the study of physics, mathematics, optics, astronomy, astrology, mineralogy, botany, and natural history. Above all, physics is important, for "where the physicist stops the physician begins." The medical subjects to be studied are: anatomy, the art of medicine, dietetics, semiology, cures, surgery, the common pharmacopeia, the spagyric pharmacopeia, and the composing of remedies.

Last, but not least, Bartholin recommends foreign travel. He says: "For every soil does not produce everything neither of vegetable nor of animal origin. And one place or province does not collect all the prominent teachers." Bartholin well knew what he was speaking of. He had travelled for seven years abroad himself. For the study of anatomy he recommends Italy and the Low Countries, especially Padua and Leyden. The best herb gardens are to be found at Padua, Pisa, Bologna and Montpellier. Clinical medicine can be studied at Padua and Florence, the spagiric pharmacopeia at Wittenberg and other German universities. The best surgeons are to be found in Italy and France, and "you shall not be ashamed," he says, "to engage yourself in the work, and, by its daily practice, to take note of special things not known to every ignorant barber."

As may be seen, Caspar Bartholin does not mention Great Britain at all, although he himself had paid a visit to London in his youth. Neither does he mention Switzerland, although he himself and several other Danish doctors had taken their degrees at Basel. They did so with a view to economy, because it was a very expensive affair to graduate in Copenhagen. The general practice of the Danish students of medicine was to study two or three years at home. Then they would go abroad to the universities on the continent. But some of them also crossed the Channel to visit England. The favourite places were London and Oxford, but visits of interest were also made to Bath and Salisbury.

Thus Caspar Bartholin's brother-in-law Oluff Worm stayed a year and a half in England (1611-13). He practised medicine in London and studied in the Bodleian Library at Oxford. Worm, who later became a professor in the University of Copenhagen, was the founder of the first museum of natural history in Denmark, the

famous Museum Wormianum.[2] His name is still remembered in anatomy in the Wormian bones of the skull.

One of Caspar Bartholin's sons, Erasmus Bartholin, visited London and Oxford in 1647. Because of the civil war—it was in the days of Charles I and Cromwell—he stayed only for a short while but, despite this short stay, he nevertheless became a famous man. Erasmus Bartholin was educated as a medical man, but he took more interest in physics. In 1669 he published the first Danish work on experimental physics, the treatise on *The Iceland Spar*. In this he gave an account of the interesting fact—never before observed—that a ray of light on entering the crystal divides into two rays, and that only one of these follows Descartes's law of refraction. This discovery is said to have been a touchstone for Huygens's undulatory theory of light.[3]

Another son of Caspar Bartholin became famous too. He was Thomas Bartholin, the discoverer of the lymphatic vessels and the first to demonstrate the thoracic duct in man. Thomas Bartholin travelled for ten years abroad. He did not visit Britain, but he pays the British a fine compliment in his book on medical travels published 1674. His words run: "The Germans unite in a friendly way the Paracelsian doctrines with the rest of medicine, but in the completely new medicine founded on experiment the British exert themselves, being fortunate in the fertility of their geniuses and the supply of the necessary resources."[4]

Certainly Bartholin is here referring to the greatest medical achievement of the seventeenth century, if not of all ages, Harvey's discovery of the circulation of the blood. It is a matter of general knowledge that Harvey's discovery, when published in 1628, made a great sensation but did not gain implicit acceptance. The older generation, especially, had some difficulty in understanding the new doctrine, and John Elliotson certainly comes near to the truth when he says in his Harveian Oration of 1846: "No physician forty years old at the time believed in the circulation before he died, however long his life was spared for reflection."[5]

2 Worm, Oluff. *Museum Wormianum seu historia rerum rariorum, tam naturalium, quam artificialium, tam domesticarum, quam exoticarum, quae Hafniae Danorum in aedibus authoris servantur*. Lugd. Batav. apud Johannem Elsevirium, 1655.

3 Meyer, Kristine. Erasmus Bartholin. In: *Prominent Danish scientists through the ages*. Edited by V. Meisen. Copenhagen-London, 1932, p. 32.

4 Bartholin, Thomas. *De peregrinatione medica*. Hafniae, 1674, p. 20.

5 Elliotson, John. *The Harveian oration*, delivered before the Royal College of Physicians, London, June 27th, 1846. London, 1846, p. 50.

In 1628 Worm, mentioned above, was exactly forty years old, and certainly he never did believe in the circulation. Thomas Bartholin, however, did so—but he belonged to the younger generation. He was the man who introduced the theory of the circulation into Denmark, and he was also instrumental in making the new doctrine known on the Continent.

His father, Caspar Bartholin, had in 1611 published a small textbook of anatomy, which had become very popular.[6] In 1641 Thomas Bartholin published a new and enlarged edition,[7] to which he added a letter on the circulation written by the Dutch anatomist Johannes Walaeus, one of the most prominent supporters of Harvey's doctrine. Bartholin's *"Anatomy"* was the first textbook to contain an exposition of the circulation and it was widely used. It appeared in many editions and was translated into French, German, Dutch, Italian, and English.

The first professor of chemistry in the University of Copenhagen, Oluff Borch (1626-90), visited England in 1663. It was in the days of Charles II, and Borch saw Cromwell's head on a stake in Whitehall. In Oxford he visited the various colleges. He attended the disputations and graduations and has much to tell about the ceremonies. In the Bodleian Library he was delighted to find one of his own books and some old Danish coins. The anatomical theatre was, in his opinion, inferior to that of Leyden, but he praises the learned men he met, such as Walter Charlton, Thomas Willis, Robert Sharrock, and above all Robert Boyle. Boyle and Borch were, at that time, young men of thirty-seven, both born in 1626, and Borch was deeply impressed by the ideas of his contemporary. He wrote on the 10th of August 1663 to Thomas Bartholin: "If we had a hundred Robert Boyles, Nature would soon be an open book."[8]

Another Dane who also mentioned Robert Boyle is Holger Jacobaeus. Jacobaeus, later professor of anatomy in Copenhagen University, visited England in 1678 and stayed for ten months in London and Oxford. In London he viewed, of course, Westminster Abbey, The Tower, Whitehall, and much more. He also saw the King touching for the King's Evil. He notes that the bishop stood by and said: "The King touches you, God cures you!"

6 Bartholin, Caspar. *Institutiones anatomicae corporis humani utriusque sexus.* Witebergae, 1611. Rostochii, 1622. Rostochii, 1626. Argentorati, 1626. Goslariae, 1632. Oxonii, 1633.

7 Bartholin, Caspar. *Institutiones anatomicae novis recentiorum opinionibus et observationibus, quarum innumerae hactenus editae non sunt, figurisque auctae, ab auctoris filio Thoma Bartholino movendo.* Lugd. Batav., 1641.

8 Bartholin, Thomas. Epistolarum medicinalium centuria IV. Hafniae, 1667, p. 520.

As for the colleges of Oxford, Jacobaeus was most impressed by the fact that Christ Church had a yearly income of £18,000. He considered the Bodleian the largest of all libraries, while the botanical garden was larger than that of Leyden. In the anatomical theatre he found many curiosities, such as a sword bestowed by the Pope on Henry VIII as a reward for his pamphlet against Luther. He also tells us that every year on Michaelmas day a new Mayor is elected in Oxford. He carries on that day a red thread, formerly a rope, around his neck as a token that the Mayor was once supposed to be hanged because sixty-one students had been killed. This, no doubt, refers to the classic "town and gown" riot in Oxford on 10 February 1354. Merton College, to which most of the scholars retreated as a stronghold, was besieged for a week by the townsmen, and "the gutter of Brewer's Lane ran with academic blood."[9]

In London Jacobaeus did some dissecting under Edward Tyson, lecturer on anatomy at Surgeon's Hall. He also met Croone and Sydenham. He attended several meetings of the Royal Society, but the greatest profit he gained from his conversation with Robert Boyle.

Being a young man Jacobaeus also took an interest in the English women. He writes on that topic in his diary: "The English women are generally of small stature, pious and charming. They go into taverns and drink as men do in Denmark. They pay much attention to amusements, dancing and gallantry, but they are seldom stitching, lace making or working. There is a proverb among the English: 'If a bridge was constructed between the rest of Europe and England, every woman would run there because of the idle and luxurious life.' "[10]

I have mentioned some of the principal characters in seventeenth century Danish medicine, but still the greatest figure was Nicolaus Steno, known to every medical man for the duct called after him, which he discovered in 1660.[11] Steno, originally a pupil of Thomas Bartholin, spent most of his life abroad. As an anatomist he chiefly concerned himself with the glands and the muscles. He was the first to give the correct explanation of the lachrymal apparatus, and he was the first to state that the heart is nothing but a muscle.

9 Hobhouse, Christopher. *Oxford as it was, and as it is to-day*. 4th ed. London, 1948, p. 7.

10 Jacobaeus, Holger. *Rejsedagbog* [Travel book]. Edited by Vilhelm Maar. Kobenhavn, 1910, p. 162.

11 Steno, Nicolaus. De prima ductus salivalis exterioris inventione, in his *Opera philosophica* edited by Vilhelm Maar, Copenhagen, 1910, vol. I, p. 3.

The British anatomist, Thomas Wharton, described in 1656 the whole glandular system in his *Adenographia*. He corrected many old errors, for example that the tongue was a gland, but still he considered tears a product of the brain. It is true that he had divested himself of the Hippocratic view that the brain was one large mucous gland, but not from the idea that the brain excreted waste products. Tears, he thought, were such a waste moisture. Through the nerves and minute openings in the eye this liquid was driven out to the lachrymal gland, whose purpose was to suck it up.

Steno discovered the fine excretory ducts of the lachrymal gland and stated that it secretes the tears in the same manner as the parotid gland secretes the saliva. He also demonstrated the outlet to the nose when he discovered the lachrymal ducts, and thus he could truly maintain: "Tears are nothing but a humour for the irrigation of the eye." Steno's tract on the glands of the eye appeared as a part of his "Anatomical Observations" in 1662.[12] It has lately been re-edited as a separate booklet, giving the original Latin text and an English translation.[13]

As for the heart, Harvey certainly considered it a muscle, but he also considered it the seat of the innate heat, the source of the blood, and the place where the vital spirit was created. Steno, having carefully examined the muscles as well as the heart, stated: "If it is certain what Reason by means of the senses holds certain, that nothing is lacking in the heart which is to be found in the muscle, and the muscle is not deprived of anything to be found in the heart, then the heart cannot be of a special substance, nor the seat of special substances such as the fire, the innate heat, or the soul; nor can it be the generator of certain humours such as the blood; nor the producer of certain spirits, e.g. the vital spirit."[14]

In this short address I cannot possibly mention all of Steno's achievements, but still I should like to say a few words about the so-called Steno experiment, because it led to a certain confusion in the Royal Society. Steno maintained that not only nerves but also a blood supply is needed for the movements of the muscles. If

12 Steno, Nicolaus. Observationes anatomicae quibus varia oris, oculorum et narium vasa discribuntur, novique salivae, lacrymarum et muci fontes deteguntur. *Opera philosophica*, vol. I, p. 75.

13 Steno, Nicolaus. *Anatomical observations of the glands of the eye and their new vessels thereby revealing the true source of tears.* With a preface and notes by Edv. Gotfredsen. Copenhagen, 1951.

14 Steno, Nicolaus. De musculis et glandulis observationum specimen. *Opera philosophica*, vol. I, p. 181.

he tied the descending aorta, the animal invariably became paralysed in the hind legs.

This experiment Steno described in a dissertation on the dissecting of a shark's head. The dissertation forms a part of his *Elementorum myologiae specimen* published in 1667.[15] When the book reached the Royal Society, the secretary, Henry Oldenburg, delivered it to Dr. Croone that he might give an account of it to the Society.

Dr. Croone did so at a meeting on 13 February 1667. He said that it contained several good experiments, among which was one "of tying up the artery descending from the head, and thereby depriving the animal immediately of all motion."[16] As Steno is speaking of a ligature of the descending aorta, and a paralysis of the hind legs only, either Dr. Croone misunderstood the text or his account was wrongly reported by the secretary. The experiment, however, was ordered to be tried before the Society by Dr. Lower, and he understood the matter correctly.

At a meeting on the 27th of February, Lower reported that he he had performed the experiment on a dog, but he had not been able to produce the result related by Steno. As Lower had made the compression with his finger only, it was ordered that at the next meeting he should be desired to open the dog's abdomen, and use a ligature as Steno had done.[17]

At the next meeting Lower performed the experiment in this way, but although the ligature was tightly tied the animal went on all four legs. It was ordered that Dr. Lower should be desired to try the same experiment on the ascending artery, and that Steno's book should again be consulted to verify his method.[18]

Lower tried once more, still on the descending aorta, but being again unsuccessful he left the problem to Dr. King. King tried twice, but he, too, in vain, and on April 2d it was ordered to be recorded that the experiment made after such a manner had not succeeded.[19]

King, however, did not feel himself satisfied with that. So he tried the experiment in private, and on July 16th he eventually succeeded in demonstrating it before the Society. The dog, upon

15 Steno, Nicolaus. Canis carchariae dissectum caput. *Opera philosophica*, vol. II, p. 125.

16 Birch, Thomas. *The history of the Royal Society of London*. London, 1756, vol. II, p. 247.

17 *Ibid.*, p. 254.

18 *Ibid.*, p. 255.

19 *Ibid.*, p. 256, p. 259, p. 261, p. 296.

which it was made, was seen to be deprived of all motion below the point where the descending artery had been tied.[20]

Steno was not only an anatomist. He also studied geology, and, as a matter of fact, geologists honour him as the founder of their branch of science. Steno was the first to explain how, in the course of time, the different strata of the earth's surface have been deposited. His treatise on that subject, "The Prodromus to a Dissertation concerning Solids naturally contained within Solids," appeared in Latin at Florence in 1669.[21] Two years later an English translation, made by Henry Oldenburg, was issued in London.[22] In 1916 a new English translation, made by John Garrett Winter, appeared in New York.[23]

Steno's scientific life was very short. At the age of thirty-six he was converted to the Roman Church. The following year he took holy orders and, from then on, he lived an ascetic life aloof from all science.

Proceeding now to the eighteenth century, I shall first mention Jacques Bénigne Winslow, the most prominent anatomist in France in the first half of the century.[24] His name is known to every medical student because of the foramen described by him in 1715. Winslow was Danish, his baptismal name being Jacob Winsløv. He was a distant relative of Steno, and like him he was converted to the Catholic faith and stayed abroad. He was for many years a renowned professor in Paris.

Winslow's principal work is his *Exposition anatomique*, a textbook of anatomy.[25] It appeared in French in 1732 and the following year in English, translated by Doctor G. Douglas of London.[26] Steno was greatly interested in the problems of muscle, and so was Winslow. Winslow showed that the action of a muscle is often com-

[20] *Ibid.*, p. 306.

[21] Steno, Nicolaus. De solido intra solidum naturaliter contento dissertationis prodromus. *Opera philosophica*, vol. II, p. 182.

[22] Steno, Nicolaus. *The prodromus to a dissertation concerning solids naturally contained within solids. Laying a foundation for the rendering a rational accompt both of the frame and the several changes of the masse of the earth, as also of the various productions in the same.* English'd by H. O. [Henry Oldenburg]. London, 1671. Printed by J. Winter, and are to be Sold by Moses Pitt at the White-Hart in Little Brittain.

[23] Steno, Nicolaus. *The prodromus of Nicolaus Steno's dissertation concerning a solid body enclosed by process of nature within a solid.* An English version with an introduction and explanatory notes by John Garrett Winter. With a foreword by William H. Hobbs. New York and London, 1916. (University of Michigan Studies. Humanistic Series. Vol. XI, Part II).

[24] Maar, Vilhelm. *L'autobiographie de J. B. Winslow.* Paris-Copenhague, 1912.

[25] Winslow, Jacques-Bénigne. *Exposition anatomique de la structure du corps humain.* Amsterdam, 1732. 4 vols.

[26] Winslow, J. B. *An anatomical exposition of the structure of the human body.* Translated from the French original by G. Douglas. London, printed for N. Prevost, at the Ship, in the Strand, 1733. 2 vols.

plex. The biceps, for example, was thought to act only as a flexor of the forearm. Winslow stated that if you flex your arm and then supinate your hand—at the same time touching your biceps with your other hand—you will feel the biceps moving. This shows that the biceps, in this position of the arm, is a supinator.[27]

In the first half of the eighteenth century Danish students still travelled abroad, but in the latter half of the century these travels lost importance, because the medical teaching in Copenhagen had now become satisfactory. In 1757 a hospital for clinical instruction, The Royal Frederic Hospital, was set up. In 1761, a Maternity Hospital was established, and in 1785 the Royal Academy of Surgery was founded.

Even at this time some medical men—and generally the best—went abroad for further education. The men who set out for Great Britain were mostly surgeons. They went to London to hear the famous brothers, William and John Hunter, and the renowned Cheselden at St. Thomas's Hospital. A few also visited Edinburgh, where the favourite teachers were Monro, Cullen, Gregory, and Black.

I shall mention only one Dane, viz. Johan Clemens Tode, who visited Edinburgh and London in 1766-67. Tode is chiefly remembered for two things. He was the first on the Continent to distinguish clearly between syphilis and gonorrhea, and he was the founder of the Royal Society of Medicine of Copenhagen. For both he was indebted to Edinburgh.

Before Tode's time it was believed that the two venereal diseases were one and the same. This opinion was supposedly confirmed by John Hunter, who, in 1767, made his heroic self-experiment. The first to oppose Hunter was Francis Balfour of Edinburgh, and on the Continent Balfour was well supported by Tode, who wrote in German.[28]

In 1772 Tode founded the Royal Medical Society of Copenhagen, which is the second oldest medical society in the world, the oldest being the Edingburgh Royal Medical Society, founded in 1737. From Edinburgh Tode brought the idea of a society to Copenhagen, and thus the Scottish society may be said to have been the model for that of Denmark.[29]

27 Winslow, J. B. *Exposition anatomique*, Tom. II, p. 328, no. 872. In the English translation by Douglas, Vol. I, p. 142, no. 870.

28 Tode, Johann Clemens. *Vom Tripper in Ansehung seiner Natur und Geschichte.* Kopenhagen und Leipzig, 1774.

29 Johnsson, J. W. S. Sociétés médicales en Danemark. *Janus*, 1922, *26*, 354.

The greatest British medical achievement of the eighteenth century was, no doubt, Edward Jenner's vaccination against smallpox. His famous treatise, *An Inquiry into the Causes and Effects of the Variolae Vaccinae,* appeared in 1798, and three years later, in 1801, the first vaccination was performed in Copenhagen. The lymph was acquired direct from Jenner. The Danish pioneer was Frederik Christian Winslow, a relative of the anatomist in Paris. He was surgeon-in-chief to the Royal Frederic Hospital, and had, for some time, studied under John Hunter in London.

Many more interrelations between British and Danish medicine in the seventeenth and eighteenth centuries might be mentioned, but Life being short, and Art long, I shall now conclude.

The Friend of the Bereft
George Anthony Zeller, M. D.
1858-1938

MAXIM POLLAK AND WALTER H. BAER*

THE institutional care of the psychotic in Illinois had its beginning in the Memorial presented by Dorothea Linde Dix before the General Assembly in Springfield on 11 January 1847.[1] To be sure, for many years many persons had been fostering interest in and arousing public demand for the erection of an insane asylum, but not until the session of 1847 was a bill introduced.[2] At this time the legislators could not resist the powerful emotional appeal of a woman who had won nation-wide acclaim for her crusade in fighting for the humane treatment of the insane. And so, with the signature of the Governor, Augustus C. French, on 1 March 1847 the law was enacted to establish the Illinois State Hospital for the Insane, at present the Jacksonville State Hospital.

The Board of Trustees met and organized 21 March 1847. It consisted of nine members, appointed by the Governor and given full authority for the purchase of land, erection of buildings, and management of the institution. Land was purchased and construction was begun in the summer of 1847. For various reasons, however, the hospital was not completed until the fall of 1851; the first patient was admitted on 3 November. Dr. James W. Higgins was the first superintendent. In June 1854 he was succeeded by Dr. Andrew McFarland of New Hampshire, one of the original members of the Association of Medical Superintendents of American Institutions for the Insane (later to become the American Medico-Psychological Association, and now the American Psychiatric Association).

The appointment of Dr. McFarland marked the starting point of the modern era in the care of the psychotic in Illinois. The ideas he advocated during his sixteen years of service (he resigned in 1870) were epoch-making. Handed down through an unbroken

* Springfield, Illinois.

1 Dix, Dorothea Linde. Memorial to the Illinois Assembly. *Institution Quart.*, Springfield, Ill., 1915, *6*, 37-45.

2 Gerty, Francis J. Notes on the early history of Jacksonville State Hospital. *Welfare Bull.*, Dept. of Public Welfare, Springfield, Ill., 1947, *38*, 7-8.

line of pioneers like Frederick Howard Wines, Dr. Richard Dewey, Dr. George A. Zeller, Archie L. Bowen, and others and fructified further by these men, McFarland's ideas form the foundation of our present-day psychiatric care, although they still await complete fulfillment.

The Illinois State Hospital for the Insane with a capacity of two hundred and fifty beds was constructed on the historical Kirkbride plan, the most advanced in those days and considered inviolate by the leading psychiatrists for many years to come. The insane of the state in need of hospital care numbered many times more than two hundred and fifty. They filled the county almshouses and were in a deplorable condition. After continued agitation the Legislature finally in 1869 authorized the establishment of two additional hospitals to be managed by independent boards.

To provide better supervision for the charitable institutions of the state, including the mental hospitals and prisons, the Legislature in the same year also established the Board of State Commissioners of Public Charities. The Board, however, acted only in an advisory capacity and had no administrative authority. The first Board was appointed by the Governor in April and organized immediately. By a stroke of good luck the Board appointed Dr. Frederick Howard Wines, the Pastor of the Presbyterian Church in Springfield and a graduate of Princeton University, as its Executive Secretary. From the day of his appointment until his death on 31 January 1912, with the exception of a few years, Dr. Wines served his state and the cause of human welfare with notable distinction and became a highly respected and internationally recognized leader in this field.

Starting his work with the Board of Charities he had to face the grave problem of providing adequate institutional care for the numerous psychotics still languishing in the almshouses and on the poor farms. In an attempt to obtain the best available advice toward the solution of the problem, Dr. Wines addressed a letter of inquiry to "every known superintendent of an asylum in the country" and called "the officers of the state, and of the three insane asylums, with the commissioners of public charity" to a Conference of Insanity. The Conference met on 10 November 1869.[3]

After reading the many answers to Dr. Wines' inquiry, Dr. McFarland was called upon to state his views. Sketching briefly the history of the treatment of insanity, he sharply delineated "the

[3] The conference of insanity. First Biennial Report, Commissioners of Illinois Public Charities, Springfield, Ill., 1870, pp. 98-117.

three leading ideas, which have successively controlled the organization of institutions for their benefit [the insane]": (i) exorcism, (ii) medical treatment, and (iii) treatment by restraint. Although these methods of treatment succeeded each other chronologically, the asylums retained the archaic form of the monastery in which the insane were first cared for, he declared.

Dr. McFarland lashed out strongly against restraint. He stated that in a large institution perhaps only one-fourth of the patients would require this method of treatment. Yet "the present system of architectural construction adapts the entire institution to the demands of its smallest and worst class." "For those who do not need it [restraint]," he went on to say, "the bolts and bars found in all our asylums are not only no advantage, they are positively injurious. They irritate many patients and retard their recovery." "Under the existing system of confinement," he declared, "[the patient] has not sufficient occupation or useful employment, by which the springs of life may be stirred." "Under ordinary circumstances man gets his stimulus from the every-day pressure of business and the presence of his family. But in insane hospitals, stimulus, which is indispensable, is lacking. All is vacuity."

Replying subsequently to a query on this point Dr. McFarland added: "The question may well be asked, why employment cannot be given in our present institutions? The reason is this. The patients are under the charge of men who are nurses. They do not think that they have anything else to do." "In an insane asylum," he went on to say, "organized upon an industrial basis, on the other hand, the attendants would not be simply nurses. They would consider themselves employed not merely to aid the patients to rise and dress, and so forth, but *to labor with them, side by side, in the fields and the shops*" [italics ours].

"Still another evil of asylum life," he continued, "is the absence of association, under proper auspices and restrictions, of the sexes. A principal craving of human nature is the desire for the company of the opposite sex. It is everywhere a healthful impulse. The insane man needs to see the ordinary domestic occupations of life going on around him." "My conception of the true organization of an asylum would be this," he said, "I would have the central hospital in the foreground. At a little distance I would have a group—not cottages; they should be houses, of two stories in height, each to accommodate its forty inmates. The foundation of the entire organization should be industrial."

"I foresee the great difficulty which will meet the men who undertake this experiment," he concluded. "To innovate is hard, to imitate is easy. It is as easy to imitate as to draw the outline of a chess board. But to innovate requires earnestness akin to fanaticism—a determination that the innovation shall prove a success."

Dr. McFarland's exposition carried the day. The conference resolved that "so far as practicable, a combination, in insane asylums, of the cottage system with that at present in vogue, is desirable," and also "that there are weighty reasons for the belief that such a combination is practicable, and that it would increase both the economy and efficiency of asylums for the insane."

We have quoted at length from the records of the Conference, because we believe that it is not only an important historical document, but more particularly because we are convinced that the ideas expounded deserve serious consideration and translation to reality in our own day. Remember, this program was presented in 1869. If you walk through our "modern" mental hospitals of today with their day rooms in which the patients mill around aimlessly, or sit staring in a vacuum hopelessly, you know how far we are still from Dr. McFarland's objectives. Indeed decades have proved that McFarland was right when he foresaw that "to innovate is hard." Even the Boards of the two asylums authorized in the same year by the State Legislature were not influenced by the resolutions of the Conference. They went ahead with their plans undisturbed and built the two asylums at Elgin and Anna on the old Kirkbride plan. Not until eight years later, when the Legislature authorized the erection of the fourth asylum, was McFarland's plan actually realized. The asylum was erected at Kankakee and opened on 4 December 1879. Since then, under the name of the Kankakee plan, McFarland's ideas have revolutionized the construction of our mental hospitals.

The Kankakee Asylum had no fence or wall around it. In addition to its main building, where the acute patients were housed, only two of the detached cottages had guards or bars on the windows.[4] The first superintendent, Dr. Richard Dewey, kept mechanical restraint and seclusion of the patients to a minimum by an ingenious order.[5] All devices for restraint were kept in the dispensary in the central building. When need for restraint ap-

[4] Hurd, H. M., *Ed. The institutional care of the insane in the United States and Canada.* Baltimore, Johns Hopkins Press, 1916-17. 4 vols. (Vol. 2, p. 233).

[5] *Ibid.*, p. 235.

peared imminent, the physician on duty had to be notified; he in turn visited the patient and prescribed the manner of restraint, the length of time and the hour when the apparatus had to be returned. A record was kept in the office, and the attendant entered his notation on the daily ward report. The two reports were checked against each other daily.

From the very beginning when the Legislature took action to erect the first asylum at the prodding of Dorothea Dix in 1847, it was its intention to liberate the unfortunate insane from the dungeons of almshouses and poor farms. Subsequent Legislatures reaffirmed this decision by erecting one asylum after another. Yet the vexing problem defied a solution. Finally in 1895 the Legislature authorized the establishment of the Illinois Asylum for the Incurable Insane with the express purpose of moving to it the insane languishing in the almshouses. The cornerstone of the institution was laid that same year in Peoria County in the town of Bartonville. The construction, however, was beset with innumerable difficulties and a stormy history.

In 1896 the governorship passed from the hands of Altgeld, a Democrat, to Tanner, a Republican. The new Governor found that the building, already under erection, was faultily constructed and stood over an abandoned coal mine. He ordered the building razed and new construction started. In July 1898, while building was still in progress, Governor Tanner appointed as superintendent Dr. George A. Zeller, then a practising physician in the city of Peoria. This appointment was clearly a reward for Dr. Zeller's political activities in behalf of the Republican party. At this time no one foresaw what revolutionary changes this political appointment would bring about in the care of the mentally ill.

Dr. George Anthony Zeller was born in 1858 in Spring Bay, then a thriving river town on the east bank of the Illinois, about ten miles north of Peoria. His father, Dr. John George Zeller, came to this country from Germany for the first time at the age of eighteen in 1846. After two years of travel he returned to his native land, but he did not remain there very long. The uprising of 1848 against tyranny quelled, the times were not propitious to liberty-loving men. So four years later he emigrated to America like many others of the era of Carl Schurz, the Civil War general. After graduation from the Medical Department of the University of St. Louis, Missouri, he settled in Spring Bay, Illinois, and married. He inculcated in his son from his early childhood a fierce love of liberty, a

strict sense of duty, hatred of oppression, and utter respect for the dignity of man. The boy was steeped in deep reverence for Abraham Lincoln and all his ideals. From his mother he inherited a tender heart, shrinking from abuse in any form. We are told by Miss Josephine M. Zeller, his sister, that when their father remarried after their mother's death, George would never permit his stepmother to inflict punishment on her own children.

Dr. Zeller attended the village school and in due time entered the University of Illinois, taking elective courses for three years. He "was never a diligent student," as he himself put it, but spent much time in the library. He "learned by absorption." He then entered the Medical Department of the University of St. Louis, his father's alma mater, graduated with the first three-year medical class in March 1879 and returned home to practise with his father. In 1883 he attended the practitioner's course at Rush Medical College and in 1889 married Miss Sophie Kline of Henry, Illinois. Larado Taft, the celebrated sculptor and his classmate at Illinois, was his best man at the fashionable wedding. For a honeymoon he took his bride to Europe, where he spent six months attending the clinics of Berlin and London and listening to the lectures of von Bergmann and Joseph Lister, among others. After this trip he settled in Peoria and established a lucrative practice there.

When he had reached voting age, he joined the Republican party in Spring Bay and took a leading part in its activities. He continued with his political interests in Peoria. Here at one time he was simultaneously the chairman of the City and County Republican Central Committees. He worked hard for the election of McKinley and Governor Tanner. He was never an opportunist, but the fight for the party of Lincoln was in his blood. The drudgery of every-day practice evidently did not hold much interest for him. Hence he was glad to accept from Governor Tanner the superintendency of the new Asylum.

Since the institution was still under construction, he had no particular employment and received no salary. Prompted by patriotic fervor he volunteered for one year's service in the Philippines. During his absence Governor Yates succeeded Tanner and renewed his appointment. At that time the cholera epidemic was at its height in Manila and he was kept busy fighting it. His deep sense of duty did not permit him to ask for his release. When the epidemic subsided by the end of August 1902 he was mustered out. He arrived home late in October 1902 and on 1 November took

charge of the Asylum, which had been opened in his absence on 10 February 1902.

Upon taking office Dr. Zeller found deplorable conditions. First, not a single one of the 690 inmates had been drawn from the almshouses as specifically required by the law authorizing the erection of the Asylum. Then, the Asylum was more like a prison than a medical institution, with heavy gratings and bars on the windows and doors, and many inmates restrained by various devices and kept in seclusion by locked doors with their abominable peepholes. He set about to improve the situation immediately. Buildings intended for other uses were converted into dormitories, and by the autumn of 1904 eight new additional cottages were ready to accept new inmates. As soon as beds became available he requested the county judges to transfer to the Asylum a definite contingent of the insane kept in the almshouses. During three months, with the admission of seven hundred new inmates, the population was doubled. With the continued construction of new buildings the patient population rose to 1,449 on 30 June 1905.

Under the title, "Twentieth Century Witchcraft," in his 1908 Biennial Report[6] Dr. Zeller gave a vivid description of an inmate who was brought to the Asylum in a clothes basket with the first contingents. "For 43 years Rhoda Derry, deformed, demented and helpless was kept in a box in which straw had to be changed several times a day. In one of her spells she beat out her own eyes." Judging from the description of a case given by Miss Dix in her Memorial of 1847 the almshouse care of the insane had not changed very much in the intervening years. At the Asylum "Rhody" was given the best of care by her nurses and when she died two years later there was not "even a bedsore upon her deformed body." "The impression of a human service dutifully rendered has shed its halo about them (her nurses) and the institution is better for having cared for her; the State is better for the knowledge that justice was finally done this long neglected woman," the report concludes.

Dr. Zeller was without any experience in the care and treatment of the insane and yet he was charged with the responsibility of directing the activities of a large asylum. His inexperience, however, kept him free of the accepted practices of the day. His genuine sympathy for the downtrodden made him an apt pupil of the teachings of McFarland and Wines. Fearlessly he dared to

[6] Seventh Biennial Report, Illinois General Hospital for the Insane, Springfield, Illinois, 1909, pp. 21-22.

introduce the innovations championed by them in theory. Gradually the gratings and bars were removed from the windows and doors, the restraining devices discarded, the seclusion room doors kept ajar day and night, the doors of the cottages kept open; female attendants or nurses were placed in charge of every ward, including those for men, and by 1 November 1905 the patients of the hospital lived a community life closely resembling the normal. When new buildings were added to take care of the increasing number, he discarded the Kankakee plan of construction. There is no impressive quadrangle at the Peoria State Hospital as is the case at Kankakee. The buildings erected under his tenure of office do not form a "row." There is not even a connecting passageway between them. These things formed part of the "institutional" atmosphere against which Zeller constantly fought. Walk through the grounds of the hospital today and you will hardly sense that you are in an institution." Only at the western fringe will you see a "row" of three new buildings, erected there for economy, but in utter disregard of the spirit of the institution.

In this revolution Dr. Zeller was aided by his loyal associates, chiefly Dr. George W. Michell who was appointed early in 1904 immediately after finishing his internship. Together they overcame the difficulties (and there were many) raised by the "experts." Dr. Zeller developed a genuine mistrust of these "experts" because they clung to precedent and outworn traditions and objected to the "abolition of archaic methods and the substitution of modern, humane and scientific standards."[8] Mack Leiter,[9] his trusted maintenance man since the early days, relates that it soon became known among people seeking employment that those with asylum experience need not apply. Should, nevertheless, an "asylum tramp" become employed by withholding his past, the eagle eye of the superintendent soon discovered this oversight, and the "tramp" was discharged. Even in closely guarded institutions patients escape. When this occurred at Peoria, the young librarian, Myrtle McKee (who later married Dr. Mitchell) was sent to the city to retrieve the culprit from the police. It was her custom to return the patient to the asylum on the streetcar, and this served as an object lesson to the police and public that even a young girl can handle a "madman."

[7] Befriending the bereft. Autobiography of Dr. George A. Zeller. *Asylum Light, Peoria Illinois State Hospital,*

[8] *Ibid.*

[9] Personal communication.

Guided by the conviction that employees working thirteen to fourteen hours daily, as was then the custom, are too exhausted to give decent service, he introduced the eight-hour tour of duty in 1905. He proved to his own and to his superiors' satisfaction that this innovation did not materially increase the payroll.

By 1 October 1905 he had ready a Rule Book which was handed to every employee entering service. These rules were condensed, and a printed copy was hung on the wall of the office of every attendant and nurse. Here are the most important of these rules:

1. A tour of duty is limited to eight hours a day except in emergencies.
2. The inmates are not to be imprisoned or secluded. . . .
4. Mechanical restraint will never, under any circumstances, be applied to any inmate.
5. Non resistance should be the guiding rule in our attitude toward the inmates. It requires an antagonist to provoke a quarrel, hence, when inmates are unruly, they are to be soothed by gentle words and gentle manner. . . .
7. Fire! Turn in the alarm, take down the hose and turn on the water. . . . Make no effort to save valuables as long as one life is in jeopardy. . . .
14. The public demands courtesy of its servants. Never forget the misfortunes of your charges or the sorrow of their friends and relatives.

Thus in three short years he revolutionized the care of the mentally ill in his own institution. Commemorating this event and as a momento for his successors to come (he often reiterated his belief that mental institutions must constantly be watched lest they backslide to the old ways) he had erected in front of the Administration Building a sundial with the inscription on its four sides:

"Eight Hours Labor
Non-Imprisonment
Non-Resistance
Non-Restraint."
The date A.D. 1905

But the fight was not over. He had to reach his fellow superintendents. So he prepared a paper on "Mechanical and Medicinal Restraint," and read it on 19 October 1906, before a Departmental Conference attended by the Governor, the State Board of Charities, and all the superintendents.[10] In this he said:

Search the statutes of Illinois as you may, and you will fail to find anywhere a clause legalizing the infliction of bodily injury except in the case of the hangman alone, and then only after a verdict has been rendered by a

[10] Sixth Biennial Report, Illinois Asylum for the Incurable Insane, Springfield, Ill., 1907, pp. 75-79.

jury and the pardoning power of the Chief Executive has been sought in vain. *When men are executed upon the order of an assistant physician there will be some excuse for the restraint law of Illinois.*

The history of the movement working toward the amelioration of the condition of the insane is but the history of the curtailment of abolition of mechanical restraint. Narcotics were not sufficiently known to the ancients to have been a factor in the subjugation of the unruly, but might and force and brutality have been agents by which the strong overcame the weak from the days of Cain.

The utmost that the advocates of mechanical restraint could say was that *the abolition of restraint needlessly increased the labors of those whose duty it was to care for and treat the insane. And let me say right here that this is the only motive that lies behind the application of mechanical restraint today. Physicians may ease their conscience that it is the welfare of the patient that they are considering, but I have invariably found that the convenience of the attendant governed this as well as every other asylum abuse.*

Seclusion is the cause of more melancholia and depression and suicide than any feature of institutional life. Mechanical restraint will infuriate and finally kill by the interference with the normal functions of the body and death from such a cause is an outrage, but seclusion brings on a condition of the mind from which death is a welcome relief.

As grave as either of the previous abuses is the *resort to soporific or sleep producing medication.* [Italics ours.]

Strong words these. Not since the famous open letters of the immortal Semmelweis, directed about half a century before to the leading obstetricians of his day accusing them of murder because they refused to accept the contagion theory of puerperal fever and permitted thousands of women needlessly to die following delivery in their hands—not since Semmelweis we repeat—did a medical man brand and inflict with such fire the prevailing practices of his day. No wonder the paper was received in silence and was not deemed worthy even of a rebuttal. A newcomer to the field was lecturing to old seasoned experts with many years of psychiatric practice behind them. The silence notwithstanding, this paper is a classic in medical literature and deserves close study by every student of medicine in general and psychiatry in particular.

Dr. Zeller not only preached the sermon but enforced every rule he has promulgated. One of his former residents, at present a Professor of Psychiatry at an outstanding Medical School, tells us that once he was nearly fired from his job, because one night Dr. Zeller caught him attempting to administer a hypodermic. Mrs. Thelma Watt, Superintendent of Nurses, relates the story that while she was a student nurse, Dr. Zeller noticed that her head nurse had restrained a patient with a sheet. He became outraged at the sight and told her in no uncertain terms that "if a patient is

sick enough to be restrained, he is sick enough to be given adequate nursing care." The sheet had to be instantly removed, and the patient properly taken care of.

By following his principles in the management of his hospital he fought a brave continuous battle. Every incident occurring in the hospital, every rumor aired sensationally in the newspapers, every complaint brought to the attention of the Board of State Commissioners of Public Charities (later the State Charities Commission and Board of Administration) or the Governor, was scrupulously investigated by coroner's juries, or executive secretaries of the Commission (or Board). His superiors stood by him with benevolent tolerance. But their interpretation of "restraint" did not tally with his.

Said Dr. Frank Billings, Chairman of the State Charities Commission, in his Annual Report of 1910,[11]

> mechanical, medical and chemical restraint has been wholly abolished from the Illinois hospitals for the insane. The only forms left are the camisole, the soft leather armlet and wristlet. . . . What can be accomplished in reducing restraint is illustrated in the case of one hospital which reports that from 10 October 1909 to 10 December 1909, a period of two months, there was a total of 41,000 hours of restraint among its patients. During the corresponding period of this year the total hours of restraint were only 14,000.

In the same report, however, the Executive Secretary of the Commission stated after his investigation of an unfortunate accident at the Peoria hospital, that

> screens do not form a restraint in the meaning in which that term is used. The humanity of the superintendent at this institution [Peoria State Hospital] is commendable in its highest sense. This Commission believes in the fullest liberty and freedom for the patients in the hospitals for the insane, but it also believes that *there is a limit beyond which it may become a menace* [italics ours], not only to those whom it is sought to serve but to the public outside.

In his report to the Governor he stated further that, "while these conclusions in my judgment are fully justified, your Excellency must realize that they are antagonistic to the so-called 'non-restraint' policy which Dr. Zeller has carried out at South Bartonville with considerable fidelity. I have great sympathy with Dr. Zeller's humane policy. Perhaps Dr. Zeller is the prophet, who is pointing the way where others now skeptical will follow." So he recommended that some of the cottages be provided with pro-

[11] First Annual Report, Illinois State Charities Commission, Springfield, Ill., 1911, p. 23.

tective gratings and kept under lock and key. The order had to be followed and the cottages in question were protected again with the gratings removed a few years before.

The first statewide action came in 1912 when Dr. Frank P. Norbury, State Alienist, ordered that restraint be applied on "prescription" only.[12] But it was not until Governor Edward F. Dunne (a Democrat) brought together a new bipartisan Board of Administration to which Dr. Zeller (a Republican) was appointed on 1 December 1913 that "restraint" was abolished in the full sense of the word.

In his first Annual Report[13] as alienist Dr. Zeller could say with full conviction that:

> Every privilege that was ever denied the insane had its origin or underlying motive in either *cowardice or indolence: cowardice whether through fear of physical danger, or lack of courage to face the world in assuming responsibility for the major or minor occurrences that take place in institutional life, or indolence because the fewer privileges granted the less work involved in caring for the insane.*
>
> Curtailment of mechanical restraint had been making headway steadily in Illinois for ten years, but precedent for its employment was so deep rooted that even the newcomers in this field were easily convinced of its necessity.
>
> *It would seem that those directly in charge would have had the vision to forsee and inaugurate this very commendable and clearly indicated reform, but it remained for a layman and a non-institutional man, Honorable Fred J. Kern, the President of this Board, to issue the order finally and effectually abolishing mechanical restraint, seclusion or corporal punishment in all of the institutions of the State."* [Italics ours.]

This was the hour of Dr. Zeller's greatest triumph, but he took it with his characteristic modesty. He acknowledged that the policy of "non-restraint" demands that whoever follows it must "face the world in assuming responsibility" for it. But does not every physician and surgeon have to face the world when his treatment or operation ends with a fatal issue? Even the most common every-day operation carries a certain unavoidable fatality. Should we dare to refuse to operate because of this? Perhaps the percentage of accidents is somewhat greater in institutions which follow a progressive policy in regard to restraint than in those which keep their patients under strong restrictions. We don't know; we have seen no comparative statistics. But granted that this be true, should we subject the vast majority of the patients to such restricions, when we know that this is to be to their detriment?

[12] Norbury, F. P. Standard of seclusion and restraint. *Institution Quart.*, Sept. 1912. Quoted by Hurd (*q.v.*), vol. 2, p. 244.

[13] Fourth Annual Report, Board of Administration, Springfield, Ill., 1915, pp. 16-17.

The opposition, however, continued. Even Zeller's successor at the Peoria State Hospital slyly stated in his Annual Report of 1916 that "this liberal policy has resulted in considerable criticism on the part of some outsiders. It is not my province to argue this question. I only bring it to the attention of your board for such consideration as you may see fit to give it."[14]

When Dr. Zeller inaugurated his liberal policies in the new hospital at Alton, where he took charge on 15 July 1917, the indignant citizens held a protest meeting under the chairmanship of the President of Shurtleff College. In addressing this meeting Dr. Zeller stated: "You gentlemen sent lobbyists to Springfield to urge Alton as the site of this institution and you knew that its population would consist of abnormal minds and now that a million dollar plant has been erected you seem to regard it as a circus tent that can be taken down and removed at will. Remember," he continued, "that the first martyr to the cause of abolition of human slavery lived and died right here in Alton. You murdered Elijah Lovejoy, but now you boast of no finer civic attraction than the magnificent monument that the state and the community erected in his honor sixty years later. His assassination did not stop the abolition movement, neither will a protest based on unjustified fear curtail the privileges which have been tardily granted the insane."[15]

The abolition of "restraint" was not his only achievement. In the 1906 Annual Report he summarized the following on the credit side:

Non-restraint
Non-imprisonment
The eight hour tour of duty
Women attendants for insane men
Segregation of consumptives (began in 1904 with a tent borrowed from the National Guard and concluded with a hospital for each sex, caring for 140 patients.)
Colonization of epileptics
Phototherapy (the application of various colors to influence the mood of the patients.)
Abolition of narcotics
Industrial re-education

But all this did not end his pioneering. Among his other accomplishments were: The establishment of a training school for nurses, (1906); the institution of regular dental service (1907);

14 Eleventh Biennial Report, Peoria State Hospital, Board of Administration, Springfield, Ill., 1917, p. 488.

15 Befriending the bereft (note 7).

the appointment of the first trained dietitian to a mental hospital in 1907; his fight against pellagra (1909-1911); his endeavor to share the lot of his patients for three days by being admitted as a patient to the hospital to discover the shortcomings of their care; his instruction as alienist to all state hospitals to admit narcotic addicts with the least formalities (if need be, under an assumed name) when the Harrison Narcotic Act went into effect. We should also mention his patriotic and civic accomplishments, and his activities in behalf of the Republican party. His short stories, based chiefly on case histories of his patients, were highly praised by at least one competent literary critic, J. Christian Bay, the Librarian of the John Crerar Library, who named him the Kipling of Illinois and who attests to the fact that Kipling himself enjoyed reading the stories. The discussion of these subjects and of many others each deserve a separate chapter but the space allotted for this paper will not permit us to do so. Some day perhaps we shall be able to present the full-length biography that his colorful personality and his pioneering achievements so richly deserve. Dr. Zeller retired from his office on 18 March 1935, after serving the mentally ill with full measure for thirty-three years, and died three years later on 29 June 1938.

On bringing this presentation to a close we join in the tribute of his good and great friend, the late A. L. Bowen, Director of the Illinois State Department of Public Welfare, engraved on a tablet placed on a boulder in front of the Zeller Memorial Building, the new Receiving Unit at the Peoria State Hospital, which reads:

> Here stood a man embodying all that is good in the State—its humanitarian instincts, purposes and desires—its demand that mercy shall be meted out to those who have felt the whip and suffered the confinements of the narrow cell. If you would see this monument, look about you with spiritual eyes and recognize his work in all states and all lands, among men who suffer from the greatest of all human plagues.

Thomas Cooper as Professor of Chemistry at Dickinson College 1811-1815

WHITFIELD J. BELL, JR.*

WHEN Dr. Benjamin Rush drafted the plan of a curriculum for Dickinson College in 1784, he gave mathematics and natural philosophy equal rank with the classics and philosophy among the subjects that must be taught.[1] From his friends in Philadelphia and in Britain he begged books and scientific equipment and once justified his purchases of apparatus with money that ought to have gone to the faculty's salaries by pointing to the "éclat" this would give the college throughout the country.[2] The chair of mathematics was filled at once, but natural philosophy seems to have been taught only when some member of the faculty had time and interest. Despite Rush's plans, science did not have a decent place in the curriculum during the first quarter-century of Dickinson's history; and his dream of an adequate scientific apparatus, though never relinquished, was never realized.[3]

But in 1808 a more promising time dawned for scientific instruction. The trustees set aside $1,000 to purchase equipment and supplies. A list was prepared of what the college owned; and in Philadelphia Rush happily ordered many of the items that were wanted and superintended their shipment to Carlisle by Conestoga wagon.[4] More than this, the trustees looked forward to the time when they would appoint a full-time professor of chemistry. In two or three years, they were confident, the natural sciences would be well taught at Dickinson.

Meanwhile, the college was progressing in other ways. After the death of its first principal, Charles Nisbet, in 1804, the college

* Carlisle, Pennsylvania.

1 Rush, "Plan of education for Dickinson College," Ms., Dickinson College Library, Carlisle, Pennsylvania.

2 Rush to Trustees of Dickinson College, Oct. 21, 1786, in Butterfield, L. H., ed. *Letters of Benjamin Rush*. Princeton, Princeton University Press for the American Philosophical Society, 1951, 2 vols., *1*, 398.

3 Rush to John Montgomery, Jan. 21, 1787, *ibid.*, 411; Morgan, James Henry. *Dickinson college: the history of one hundred and fifty years, 1783-1933*, Carlisle, Dickinson College, 1933, pp. 98 ff.

4 Bills totalling $184.88½ for scientific apparatus and books, dated October 1810, are in the Rush Mss., *42*, 142, 143, 144, in Library Company of Philadelphia. See also John Montgomery to Rush, Aug. 13, 1808, and "Apparatus for Dickinson College," *ibid.*, 107, 108.

drifted idly and dangerously with Robert Davidson as acting president. Now, in 1809, the trustees found a new principal at last. President of Middlebury College, a graduate of Yale, an experienced schoolman, Jeremiah Atwater was the kind of man who was likely to increase the college's usefulness. Atwater was not entirely unaware of what he might find at Carlisle. Once before he had declined to take a post so far south, agreeing with President Dwight of Yale that institutions of higher learning south of New York were no educational institutions at all. Dickinson offered the New Englander a challenge; in any event, he was willing to accept election.

What he found dismayed him. "Carlisle," he wrote, "has literally & emphatically long been Satan's seat. There pride & irreligion have long been enthroned & enjoyed undisputed dominion. . . . The higher class here have been little better than infidels." Rich sinners wallowed in "the pleasures of high-life, of parade, of the table & ball-chamber"; while the poor were intemperate and immoral. During the first six months that Atwater was in Carlisle, there were two duels, a suicide, and a murder. On this "rotten foundation" he was expected to build a college where discipline and religion should prevail. It was no easy task. There was no order; the young men, especially the Southerners, he wrote, were "their own masters, doing what was right in their own eyes, spending their time at taverns & in the streets, lying in bed always till breakfast, & never at the College but at the time of lecture . . . & caring nothing for any power which the faculty ever exercised." Dickinson, in short, was like "a city broken down & without walls. I find that almost everything is to be begun anew."[5]

Courageously he set to work. He got a prayer society established, though some considered such a thing "enthusiasm, fanaticism & methodism." He formed a Bible society among the ladies of town and had them distribute Bibles among the poor and the soldiers at the Post, whose commanding officer was no churchman and ordered no church parades. He even edited and published a religious magazine and proposed to found a theological seminary.[6] It was hard work, for many scoffed at his efforts and Judge Brackenridge, one of the trustees of the college, threatened to leave his

[5] On Atwater's administration and the subject of this paper generally see Morgan, *op. cit.*, 180-202; Atwater to Rush, Oct. 2, 1809, Jan. 17, Feb. 4, April 22, 1810, March 11, 1811, Rush Mss., *42*, 120, 126, 127, 128, 152; Atwater to Ashbel Green, Sept. 15, 1811, Feb. 23, 1812, Gratz Collection, Historical Society of Pennsylvania, Philadelphia.

[6] Atwater to Rush, April 22, 1810, Rush Mss., *42*, 128; Atwater to Green, Feb. 22, April 21, 1810, Gratz Coll.

wife if she did not stop attending Atwater's prayer meetings.[7] Despite all, however, within a year or two Atwater thought he detected some improvement in the moral tone of the town and the discipline of the college. The president of the board of trustees predicted that the college would reach "a Pitch of Eminence" under Atwater "not inferior to that of any other Seminary in this Country"; while Dr. Rush wrote happily that, from having been a "son of sorrow" to him, Dickinson College had now become a "child of laughter" to his heart.[8]

At this juncture (1810) the trustees elected a teacher of chemistry. Dr. Frederick Aigster was a German. At the beginning he seems to have displayed such an arrogant contempt for American education that the trustees cautiously appointed him for only one year. That proved to be a wise decision, for Aigster was totally unsuited to his post. He taught chemistry badly and refused to teach natural philosophy—this in terms which led some to suspect that his doctorate was self-conferred. He was lazy, incompetent, and offensive.[10] He was worse. In the spring of 1811 the son of Thomas Duncan, a local trustee, and a niece of David Watts, another member of the board, were about to be married. Perhaps Aigster had been a suitor for the lady's hand. In any case, he sought to prevent the ceremony. He wrote young Duncan's parents; he waited on Watts; finally he appealed to the minister not to perform the ceremony, but in such terms that the latter exclaimed that Aigster must surely be deranged. This judgment flew through the town until all Carlisle believed there was a madman on the Dickinson faculty. Under these circumstances, without waiting for the term to end, Aigster submitted his resignation and, leaving unpaid debts in Carlisle and Philadelphia, departed precipitately for the broad, unquestioning bosom of the West.[11]

The sudden resignation of Aigster left the college once more without a professor of chemistry and natural philosophy. Commencement would not occur until September and it seemed desirable to provide for the instruction of the graduating class in these subjects as soon as possible. Accordingly, a committee of the trustees, composed of Thomas Duncan and David Watts, was appointed to find a new man. They already had one in view. Only

[7] Atwater to Rush, March 25, 1811, Rush Mss., *42*, 153.

[8] Atwater to Rush, July 4, 1810, James Armstrong to Rush, Dec. 18, 1809, *ibid.*, 132, 121; Rush to James Rush, Dec. 22, 1809, Butterfield, *op. cit.*, 2, 1031.

[9] Atwater to Rush, Oct. 14, 1810, Rush Mss., *42*, 140.

[10] James Hamilton to Rush, Nov. 8, 1810, Atwater to Rush, Oct. 16, 1810, May 3, 1811, Aigster to Rush, Nov. 6, 1810, *ibid.*, 148, 141, 155, 147.

[11] Atwater to Rush, May 26, 1811, *ibid.*, 140.

two months before, Duncan and Watts had represented Judge Thomas Cooper of Northumberland in the legal proceedings by which the Legislature removed him from the bench of Luzerne County. Cooper, the two thought, would incline to their proposal as he was now without position; while as a man of unquestioned reputation as a chemist and man of science, his appointment would be a stroke of good fortune for the college. Watts hurried to Bedford, where Cooper then was, to present the offer to him. On June 17th he laid the reply before the board. Cooper would come. Though three trustees voted to postpone action, the new professor of chemistry was unanimously elected that same day, at a salary of $800 a year.[12]

Dr. Atwater was not taken entirely by surprise. For at least a week he had known how some of the trustees felt in the matter, but the action of the board shocked him all the same. That night he poured out his concern in a letter to Dr. Rush in Philadelphia:

> I am surprised, astonished & grieved. I hope the business may be arrested. . . . I think you must disapprove the appointment. It may not be too late to stop it, if you & others should let your sentiments be known. I suppose you know the character & standing of Judge Cooper. Getting him to come here would, I believe, be a fatal blow to the College. . . . A little delay may prevent this pernicious measure—one fraught with alarming consequences, in my view. . . .

To those excited sentences he added a postscript. The whole affair seemed to this Connecticut Calvinist

> more like madness than any thing else. Judge C. is said to be a man of violent passions, & haughty (some say intemperate). He has just been dismissed by the Legislature from the office of Judge & is obnoxious to all parties. He is supposed to be in religious sentiments with Priestley & to put such a man into a seminary to poison the minds of youth with his semi-infidel sentiments would be fatal to the reputation of the Institution. It would also at once blast all our hopes of Legislative aid. I feel as tho' all our pleasing prospects were now about to be clouded.[13]

Certainly Atwater had sound bases for his apprehensions. Thomas Cooper's notorious opinions in politics and religion were the antithesis of everything professed by Atwater, the clerical members of the board of trustees, and the pious and orthodox among the college constituency. Cooper was a child of the eighteenth century Enlightenment, a son of the age of reason, while they belonged to an age of religious faith that had vanished, but

[12] Trustees Minutes, May 21, June 17, 1811, Dickinson College Library.
[13] Atwater to Rush, June 17, 1811, Rush Mss., *42*, 158.

was coming again. In philosophy a materialist, in religion a Unitarian, in politics a revolutionary republican, Thomas Cooper was in everything critical, contentious, and outspoken. He was not at all suited to instructing boys under the direction of a New England schoolmaster, a graduate of Yale who believed that "the great object of Colleges is to educate young men for the ministry," and considered Dickinson important "principally as it can be made to subserve" the great cause of religion, that is to say, of Calvinistic theology.[14] Cooper's election, Atwater declared in measured phrases, was "an event in direct opposition to all my favourite plans for the prosperity of D. College. . . ."[15]

The cause of Atwater's sorrow and dismay was one of the minor prophets of the age of the Enlightenment.[16] Thomas Cooper had spent most of his fifty-odd years fighting for its noblest hopes and aspirations against the forces of ignorance and interest. The son of better-to-do parents, he was sent to Oxford but never took a degree because he refused to subscribe to the Thirty-nine Articles. He studied anatomy in London and actually attended patients in Manchester under direction; but his father insisted that he study law. For a time he was a member of a firm of Manchester calico-printers. He dabbled in chemistry and threw himself into the reform movement, supporting the proposals to abolish the slave trade and repeal the Test and Corporation Acts. He hailed the revolution in France and hurried to Paris to watch freedom triumph, only barely escaping home with his life when he was warned that Robespierre had denounced him and ordered him to the guillotine. His scientific achievements and the support of Priestley won him nomination to the fellowship of the Royal Society, but he was denied election because of his religious and political views. When Edmund Burke denounced him and another in Parliament for their sympathy with France, Cooper retorted that "Mr. Burke is probably mistaken in supposing us the worst men in the Kingdom, while *he* is still alive to make the assertion."

With liberty dead in England and unwelcome in France, Cooper looked for it in the American wilderness. He came to

14 Atwater to Rush, May 21, 1810, April 22, 1810, *ibid.*, 130, 128.

15 Atwater to Rush, Feb. 23, 1812, Sept. 29, 1811, *ibid.*, 165, 161.

16 Dumas Malone is the author of the only biography, *The public life of Thomas Cooper, 1783-1839*, New Haven, Yale University Press, 1926, as well as of the sketch of Cooper in *D.A.B.* Professor Charles Francis Himes of Dickinson College spent many years collecting materials for a life of Cooper; he published *Life and times of Judge Thomas Cooper, jurist, scientist, educator, author, publicist*, Carlisle, Dickinson School of Law, 1918, and his manuscript notes are preserved in Dickinson College Library. "Thomas Cooper as an itinerant chemist" (*J. chem. Educ.*, 1937, *14*, 153-158) by Eva M. Armstrong is brief but useful.

America in 1793 to examine the country. Liking what he found, he returned the next year with his friend Joseph Priestley, with whom he settled at Northumberland on the lovely banks of the Susquehanna. The next few years Cooper passed more or less in obscurity; but his talent for political pamphleteering soon won attention. He levelled his terrible genius at the Adams administration and the Sedition Act—and paid for his writings by a fine of four hundred dollars and six months' imprisonment. He improved this period of enforced leisure by writing a treatise comparing the law of bankruptcy in America with that in England. On his release, Cooper was appointed by his political friends one of the commissioners to settle disputed land titles in Luzerne County and three years later, in 1804, he was appointed president judge of the Third Judicial District of Pennsylvania. It was from this office that the Legislature of the Commonwealth had just now removed him.

The next few weeks, while Cooper was preparing to move from Northumberland, Atwater passed in a fever of anxiety and despair. In letters to Rush and especially to his friend Ashbel Green, minister of the Second Presbyterian Church of Philadelphia and soon to be elected president of Princeton College, Atwater poured out his hopes and his fears. With Cooper's election he saw infidelity stalking through the streets of Carlisle and all his own work overturned. He cast himself in the rôle of defender of the forces of Christianity against those of the Devil, which Cooper represented; and he knew to his anguish that between Christ and Belial there can be no compromise. He canvassed the votes on the board, calculating whether religion's friends could unseat Cooper, but sadly reckoned they could not; and, even if they should, his own position would be exposed to the revenge of Cooper's partisans and the college probably broken up. He learned what he could about the character of his new associate; it was not much, but that little was bad enough—Cooper, he told Ashbel Green in a shocked postscript, was said to perform chemical experiments in his laboratory on the Sabbath![17]

Occasionally, Atwater allowed himself some small encouragement. He seized eagerly at each report that some of the trustees were dismayed by what they had done, or that the forces of religion and morality were rallying to thwart the ungodly. From York the Reverend Mr. Robert Cathcart wrote him that he would

[17] Atwater to Green, Sept. 15, 23, 25, 1811, Gratz Coll.

protest the election at the commencement meeting of the board in September. Of the clerical alumni only Isaac Grier, formerly principal of the Dickinson Grammar School, advised the faculty to acquiesce in the appointment, but Atwater suspected that Grier's reason was that if Cooper went to Carlisle, Grier would be rid of him at Northumberland, where Grier was minister of the Presbyterian church. But there was a different story when Atwater counted Cooper's friends. Drunkards, gamblers, Unitarians they might be; but they had the votes. It was clear to Atwater that "infidelity is determined to rule this College & carry things with a high hand." And Cooper was the "idol" of the infidels.[18]

In this atmosphere Cooper came to Carlisle early in August. He had informed the trustees originally he could not come before November; but they had expressed "their very earnest wish" that he come sooner, probably so that he could instruct the upper classes in chemistry, possibly so that he would be on the ground and actually teaching when the trustees met in September. It would be harder to unseat a teaching member of the faculty than a member-elect. On August 7th Cooper took the required oath and two days later, before an audience of faculty, trustees, students, and townspeople, "in the apartment now occupied as a public Hall"— probably what is now Memorial Hall, West College—he delivered his introductory lecture.[19]

That lecture, which ran to 100 pages of text when printed, with 136 pages more of notes, was essentially a history of chemistry from Biblical and Egyptian times to those of Priestley and Lavoisier. Done in broad, sweeping strokes, it was a more remarkable achievement since Cooper wrote it without the aid of his library, which was still at Northumberland. He relied on his memory and on such works as were in the college library. More than this, the lecture was an eloquent appeal to recognize the importance of the sciences for the practical arts. Chemistry, for example, served agriculture, metallurgy, medicine, ceramics, pharmacy, textiles, baking, brewing, distilling, "even that most useful art, the art of Cookery."

> At present, there is not a manufacturer of note in England, who is not more or less acquainted with chemistry as a regular branch of education and study. Indeed, the benefit that country has received from the scientific views, and great knowledge of a few men eminent for their practical skill in mechanics and chemistry, baffles all ordinary calculation: I am fully persuaded, that the gain which has accrued to that nation, from the Duke of

18 Atwater to Green, July 8, 1811, Gratz Coll., Univ. and College Presidents; Atwater to Green, July 20, Sept. 15, 1811, Gratz Coll.

19 Trustees Minutes, Aug. 7, 1811.

Bridgewater's Canals, Sir Richard Arkwright's cotton spinning, the pottery of Wedgwood and Bentley, and the steam engines of Bolton and Watt, was much greater than the whole expense of the American War.

. . . . . .

It is to science, chemical and mechanical, that England is indebted for having made her Island the storehouse of the world, for having compelled the nations of the earth to pour into her lap their superfluous wealth, for having acquired the undisputed command of the sea; and of whom it may truly be said in the language of the prophet, 'her merchants are as princes.'

. . . . . .

In every sense of the word therefore as a practical, as well as a philosophical maxim, KNOWLEDGE IS POWER.

. . . . . .

It is knowledge then, that must render us respectable and respected; for those only who possess it are so, whether as nations or as individuals. To acquire it, we must cherish and extend the means of acquiring it. If not, we may vainly boast of the advantages we fancy we enjoy, but they will ultimately fall to those who best know how to use them. May that day not arrive, when we shall be weighed in the balance and found wanting.[20]

Such utilitarian sentiments were gratifying to practical-minded Americans. Pleased with the lecture, Jefferson urged Cooper to make the chemistry of such practical arts as bread-, butter,- and cheese-making "intelligible to our good housewives." The reviewer for the *Port Folio* almost forgave the Pennsylvania Legislature for its removal of Judge Cooper, which was "instrumental in converting a respectable judge into a much more respectable teacher of chymistry." Equally pleased, the trustees for their part at once requested that Cooper publish the address and directed the faculty to have the juniors and seniors attend Cooper's lectures at 11 o'clock Mondays, Wednesdays, and Fridays. The lectures were open to other students as well; and so many townspeople expressed a wish to attend that the trustees established a charge of $10 for auditors.[21]

Cooper was thus now at work at Carlisle, but he was not universally accepted for all that. The clergy on the board muttered that his election had been irregular. The faculty ostentatiously snubbed him, not even asking him to attend their meetings. But Cooper was not upset. He had strong friends on the board who never wavered in their support. He often dined with them at Foster's Tavern, where he boarded his first year at Carlisle. He always had their ear and he was the principal channel by which

[20] *The introductory lecture of Thomas Cooper, esq. . . . with notes and references,* Carlisle, Archibald Loudon, 1812, 94-100.

[21] Jefferson to Cooper, July 10, 1812, *Writings.* Memorial ed., Andrew A. Lipscomb and Albert E. Bergh, eds., Washington, Thomas Jefferson Memorial Association, 1903-04, 20 vols, *13,* 176-177; *Port Folio,* 1812, *8,* 111-129; Trustees Minutes, Aug. 10, 1811.

many of them learned what was happening in the college.[22] Just before the commencement meeting of the board the rector of the Episcopalian congregation in Carlisle, the Reverend Mr. J. Campbell, who was a trustee, published in the Baltimore papers and elsewhere a spirited defense of Cooper and a disconcerting attack on his traducers.

> Judge Cooper's lectures in Dickinson College continue to excite admiration & applause. He is unquestionably a great acquisition. The ignorant & superstitious here are, however, alarmed on account of his suspected creed or rather unbelief, & fear the influence he may have upon the principles & morals of our young men. These fears a *certain description of Orthodox Adversaries* have endeavoured to excite abroad, & mean to muster all their force against him. Their fears I know to be groundless. He is a friend to Christianity & the holy Scriptures. His sphere of duty is prescribed to him by the appointing & controuling power; it has no connection with theology & if he travels out of his professorship, he will incur censure & finally dismissal. But there is no danger. The splendour of his talents will soon cast his opponents into the shade. In the words of my old Friend Horace, 'Urit enim fulgore suo,' yet he is modest & reserved, as he is retired & studious.[23]

Oddly enough, for all they talked and fulminated, the clerics seem not to have organized against Cooper as strongly as they might have done. Atwater wanted Rush and Green to come to Carlisle to throw their influence against Cooper, but he did not urge them strongly and they did not leave Philadelphia. Cooper's friends, on the other hand, made it a point to be present—even the lawyers who had to travel down from Chambersburg, where the courts were sitting. As a result, Cooper's opponents could muster only seven votes. They did not care to express openly the threat they entertained privately, that they would attend no more meetings of the board until Cooper was dismissed, but in a chilly meeting contented themselves with spreading on the minutes a protest that Cooper's election was irregular and "highly injurious to the interest and reputation of the College, in consequence of the prejudices entertained by the public against him." On the other side the majority promised they would not again transact important business without first giving three weeks' notice. It was indeed a "gloomy commencement" for the friends of religion. "It is now proved beyond the possibility of a dispute," Atwater wrote after the meeting, "that the difficulty lies in having so many trustees who are so much like Mr C."[24] As for "Mr C.," he was

22 Atwater to Green, Feb. 23, 1812, Gratz Coll.

23 "Extract of a letter from a gentleman in Carlisle," from *Baltimore Federal Republican*, Sept. 21, 1811, ms. copy by J. Campbell, Historical Society of Pennsylvania.

24 Atwater to Green, Sept. 25, 28, 1811, Gratz Coll.; Trustees Minutes, Sept. 26, 1811.

still professor of chemistry. Enlightenment, he might think, had won its first test with the dark forces of superstition.

For, in some sense, this is what the quarrel over Cooper at Dickinson was—a conflict between those who, like Atwater, believed that a college is essentially a training ground for the clergy and an institution to inculcate the accepted moral and political principles of the age, and the others, the lawyers and physicians, still under the influence of the Enlightenment, who strove to make reason, science, and the practical arts prevail. That Cooper was the first chemist in America, a friend of Jefferson and Madison, a master of many sciences—these mattered little to the clergy and their supporters in the balance against his religious and political heterodoxy. He taught chemistry as it was not to be taught again at Dickinson for half a century; he personified at Carlisle, as he did wherever he went, the spirit of reason and free inquiry; but he violated the national canons of faith and conduct and—perhaps not entirely improperly—he must go. It is at least significant of the closeness of the division that the parsons, as Cooper called them, were never strong enough to force him out. Cooper had as many votes on the board in 1815 as in 1811. But neither could Cooper and the ideas and ideal he represented prevail. Had they done so, Dickinson College might have achieved the spirit and the curriculum envisaged thirty years before by Benjamin Rush, its founder, whose dream was that all the talents of American students should be trained for the service of the new American democracy.

One of the first consequences of Cooper's association with Dickinson was that the college was able to purchase a few pieces of Joseph Priestley's apparatus. Cooper had the disposal of both the equipment and the library; from the former he sold the college a reflecting telescope, a lens, an air gun, and an orrery at a total cost of $530. Cooper secured this material at Northumberland during the Christmas recess and had it shipped to Carlisle a few weeks later. At the same time he sent to Carlisle some 1,100 specimens for use in his lectures on mineralogy. His personal library followed.[25] Impressed by these collections of their famous professor, the trustees defrayed all the expenses of moving, invited Cooper to prepare a list of his needs in chemistry, and authorized

[25] *Apparatus of Joseph Priestley, the discoverer of oxygen, preserved in the collection of Dickinson College.* Carlisle, Dickinson College, 1952; James Hamilton to Rush, Dec. 1811, Rush Mss., *42*, 162; Joseph Priestley to Cooper, Dec. 25, 1811, Dickinson College Library. An inventory of the scientific equipment in the College, signed by Cooper and James Hamilton, Jr., dated May 21, 1814, is in Dickinson College Library.

him to employ "some suitable person to attend him occasionally when he delivers his Lectures."[26] When Cooper intimated one year that he could not teach during the summer term without additional compensation, twelve citizens, trustees, alumni, and merchants of Carlisle, personally subscribed $320 to guarantee the course.[27] This was perhaps the only way to treat such a man as Cooper; but his colleagues raged with envy.

In addition to his classwork, Cooper kept busy at a dozen other tasks as well. He seems always to have been in his laboratory or at his writing table. In 1812 he wrote to Jefferson that he was completing his edition of the *Institutes* of Justinian, composing as fast as he could for the printer who set up in type each morning the pages Cooper wrote the night before.[28] To provide his students with a text which would have the "advantage of being neither too voluminous for a course, nor so brief as to be obscure," he prepared an introduction and notes for a second American edition of Frederick Accum's *System of Theoretical and Practical Chemistry*. The work was published in two volumes at Philadelphia in 1814. While at Carlisle, like the advocate of the practical uses of chemistry that he was, Cooper brought together the best English, French, and German articles on the subject of dyeing and calico-printing and published a large volume on the subject in 1815. Despite its limitations, he thought it "upon the whole the best book on the subjects . . . now extant."[29] And in 1813, Cooper revived the *Emporium of Arts and Sciences*, which had recently ceased publication. His vigorous editorial hand was apparent at once on every page of the magazine. He published the best papers he could get on practical arts and manufactures, whether written by Americans or gleaned from foreign journals, and so made the *Emporium* a magazine of political economy of the first order. "The tradesmen of Great Britain, at this day," he wrote in the prospectus of the first number,

> can furnish more profound thinkers on philosophical subjects, more acute, and accurate experimenters, more real philosophers thrice told, than all Europe could furnish a century ago. I wish that were the case here; but it is not so. I fear it is not true, that we are the most enlightened people upon the face of the earth; unless the facility of political declamation be the

[26] Trustees Minutes, Dec. 17, 1811.

[27] The subscription list, undated, is in the Dickinson College Library.

[28] Cooper to Jefferson, July 25, 1812, Mass. Hist. Soc. *Colls., 61*, 171-173.

[29] *A Practical treatise on dyeing, and callicoe printing* . . . Philadelphia, Thomas Dobson, 1815.

sole criterion of decision, and the universal test of talent. We should greatly improve, in my opinion, by a little more attention to mathematical and physical science. . . .[30]

When someone protested that the editor was expressing political opinions, Cooper replied with characteristic impatience:

I hope there is no subscriber to the Emporium incapable of distinguishing between the petty discussions of party politics, and the great questions of political economy! If there be, explanation would be useless to him. . . . As to the questions of political economy—what are the principles of public action (under whatever rulers, or whatever form of government) that lead most directly and permanently, to national wealth and national power . . . I shall continue to discuss them.[31]

So indeed he did, filling his journal with arguments, statistics, reports on natural resources, and descriptions of manufacturing processes. He even admitted a lighthearted essay on cooking, whose author expressed the conviction that, could he determine the mode of his going, he would rather die gorged on turtle soup than gallantly by a sabre cut.

All the while Cooper was contributing regularly to the *Port Folio* articles on a bewildering variety of topics—Homerian mineralogy, Indian heraldry, Irish philology, Shakespeare, the fine arts, classical education (rather unexpectedly, perhaps, he favored the study of Latin and Greek), and vegetable physiology (does it hurt a turnip when you pull it?) which excited a warm debate. His private correspondence was prodigious and equally varied. With Jefferson, for example, in a single year he corresponded on banks and finance, Anglo-American relations, the common law, and French philosophy. Jefferson asked his opinion on the curriculum for the University of Virginia; Cooper's reply was full, thoughtful, and characteristic: he would allow no professor of theology to teach there.[32]

It is principally from the letters of President Atwater to Benjamin Rush and Ashbel Green that we learn of Cooper's career as a teacher in Dickinson College. These letters create the impression that Atwater was an essentially honest man, sincerely devoted to what he believed to be the welfare of the college. He had his limitations, of course, both in knowledge and sympathy. As a New England Calvinist, he could never quite overcome his revulsion at Cooper's conduct and opinions, and his opposition to the abolition

30 *Emporium of the arts and sciences*, 1813, *1*, 6.

31 *Ibid.*, 341.

32 See, for example, Jefferson's letters to Cooper in *Writings*, *14*, 54-63, 85, 173, 179-191, 199-202.

of capital punishment sounds strangely in the mouth of a Christian minister.[33] When the professor of chemistry suddenly uncorked a phial into which he had put nitric acid and bismuth and was blinded by the resultant explosion, Atwater could hardly keep the hopefulness from his letter: "I do not think he will be able to lecture again very soon."[34] But, on the whole, he tried to be fair.

"Thos Cooper has lectured with ability," he told Rush that first winter,

> & as I have been an admirer of Chemistry, I have felt it a privilege occasionally to hear him. But I have of late had some doubts of the expediency of this. It rather serves to uphold him in the view of the students & strengthen an influence which, if used badly, may prove dangerous. But, by the way, I always admire his talents & only regret that intellectual & moral excellence should not go together.[35]

Though he had assured Rush that if Cooper continued at Carlisle, there was "almost a moral certainty that a great proportion of the young men will become infidels," he later confessed voluntarily that Cooper had not yet been able to do any harm among them. "That he is disposed so to do," the Principal added, "I have no doubt."[36]

Cooper, of course, was not unmindful of all this hostility. "I am looked at with great suspicion and distrust by a body of parsons who form a large part of the trustees of this college," he told Jefferson. "I have done and said nothing since my two years' residence here to irritate in the slightest degree this *genus irritable*. I have even gone to church with tolerable regularity, but I think they hate me with more cordiality because I have furnished them with no ground of complaint."[37] Cooper needed nothing but the approval of his own conscience, and that he always had. Still, Jefferson's cordial encouragement was gratifying to him:

> Go on in all your good works, without regard to the eye of suspicion and distrust with which you may be viewed by some, and without being weary in well doing, and be assured that you are justly estimated by the impartial mass of our fellow citizens, and by none more than myself.[38]

[33] "What do the clergy think of the proposal to abolish capital punishment in the case of murder? Is not this in express violation of the word of God? Will it not hazard the peace & happiness of the State? Will not human life be unsafe, when hardened villains are no longer deterred from taking away life by the fear of death? Will not the abolition of the present law diminish in the community at large a sense of the evil of the crime of murder?" Atwater to Green, May 11, 1810, Gratz Coll., Univ. and College Presidents.

[34] Atwater to Rush, Feb. 12, 1812, Rush Mss., *42*, 164.

[35] Atwater to Rush, Feb. 23, 1812, *ibid.*, 165.

[36] Atwater to Rush, Sept. 29, 1811, Feb. 6, 1813, *ibid.*, 161, 167.

[37] Cooper to Jefferson, Nov. 8, 1813, Mass. Hist. Soc. *Colls.*, *61*, 184-186.

[38] Jefferson to Cooper, Jan. 16, 1814, *Writings*, *14*, 54-63.

Cooper's personal conduct, if reports are to be credited which were carried to Atwater, was hardly such as would inspire confidence in him among the orthodox and respectable. He drank pretty freely and perhaps imaginatively, for he is said to have introduced brandy and water to Carlisle; he swore occasionally, sometimes in the presence of students; and he was reported once to have uttered some unfriendly views on Christianity in the presence of another undergraduate. His opportunities for corrupting the youth were greatly increased, Atwater felt, when he was given an apartment in West College despite the Principal's opposition, for Cooper often invited students to his rooms to make chemical experiments[39] and he even practised a kind of medicine among them, his favorite prescription for minor illnesses being Madeira wine. There is a tradition of beefsteak parties at Meeting House Springs, with Cooper himself presiding at the fire over a stove of his own invention, for he was an accomplished cook and wrote on cookery. The year after he came to Carlisle he married Elizabeth Fleming, a schoolteacher. Two children were born in Carlisle, and the happiness of his domestic life added to the gaiety of his private manners. Sixty years later an old Carlisler remembered him as "a remarkable man in his social relations and remarkably interesting."[40]

The students soon realized that Cooper was their friend and champion. When one of the boys asked him for a list of books on politics to read, for example, Cooper produced a small pamphlet for him, printing only a few copies, however, as he explained to James Madison, "for my political Sentiments are very unlike those of any party."[41] It was probably by his influence that an allegory by Richard Henry Lee of the class of 1812 was published in the *Port Folio* in 1815. There were other ways in which Cooper could help the students. The boys of that time were often disorderly, guilty of "daring outrages," and acts of wanton destruction on the buildings, making "combinations" to resist the authority of the professors, even offering them personal indignities, as when two students pelted the professor of mathematics with birdshot during his lecture.[42] In such scrapes as these Cooper was apt to champion

[39] Atwater to Rush, Feb. 23, 1812, Rush Mss., *42*, 165; Atwater to Samuel B. How, June 15, 1812, transcript by Charles F. Himes, Dickinson College Library.

[40] Himes, *op. cit.*, 31-36.

[41] Cooper to Madison, Nov. 16, 1814, Madison Papers, Library of Congress; photostat in Dickinson College Library.

[42] Trustees Minutes, May 14, 31, 1813, March 17, 1815; a report of the faculty, July 27, 1813, signed by Cooper and others, on a rebellion against the professors of Greek is in Dickinson College Library.

the boys—at least they thought he did, and they had good reason for their belief.

In February 1812, six months after Cooper's coming to Carlisle, four students engaged in a duel. The faculty reckoned this a matter serious enough to overcome their long-standing disapproval of Cooper and invite him to meet with them. The unexpected summons found Cooper dining with David Watts at Foster's Tavern. "Of course, M[r] C. was not very well fitted to attend to business," Atwater remarked primly. According to the Principal, at this most serious meeting, Cooper was loud and abusive, treating his colleagues "quite disrespectfully." He declared that the students must not be asked whether they had actually participated in the duel, and he threatened to prevent their answering if they were. In the hall outside, with ears pressed against the door, the culprits heard all this with mounting astonishment and delight; and though they were dismissed—but later re-admitted—Cooper won the reputation of the students' tribune, and they used to toast him warmly as their champion thereafter. In short, Atwater reflected sadly, it had turned out just as Rush predicted, that in any difficult matter Cooper would try to make himself popular with the students at the expense of his colleagues. Dickinson was a house divided. What, he asked, would the faculty do "in case of insurrection among the students?" "I never wish to meet with him again in the faculty," the Principal wrote in conclusion.[43]

But it was Cooper's known character as an outspoken democrat and rationalist that was the root of the trouble. Though some persons sent sons and wards to Carlisle because of him—President Madison had two nephews at the college, for example, and the son of Jefferson's friend Pierre DuPont sent his son Alfred Victor—others withdrew theirs from an institution which cared so little for the protection of youthful morals as to keep Cooper on its faculty. The enrollment, which had been steadily rising, now began to decline. Though the war doubtless had something to do with this, Atwater blamed the trustees' infatuation with Cooper; Cooper ultimately blamed Atwater.[44] But, still the darling of a majority of the board, Cooper was the rallying point for all who opposed Atwater and the clerical influences he represented. Some even dropped hints that if Atwater should resign, the board would be agreeable. But though the Cooper affair took much heart out of

[43] Atwater to Green, Feb. 23, 1812, Gratz Coll.; Atwater to Rush, Feb. 23, 1812, Rush Mss., *42*, 165.

[44] Atwater to Samuel B. How, March 14, 1814, transcript by Charles F. Himes, Dickinson College Library.

him and he thought of resignation and even suggested that the godly portion of the college should secede and begin anew elsewhere, Atwater would not resign; and neither would Cooper.[45] He turned down two offers of appointments, one from the College of William and Mary. "Although I am very much attached to Chemistry," he had written Jefferson shortly after reaching Carlisle, "I consider myself as married to Law."[46] He talked of going to New Orleans to practise, but he did not.

The issue was finally drawn in the summer of 1815, yet not too sharply drawn even then. Cooper, whose conduct toward Atwater seems to have been one of indifference or at best cool civility, now took the offensive. Probably he acted with the approval of his trustee friends. *He* knew what a college was for, and it was high time that Atwater got out and let him make Dickinson a learned institution. In May he gave the trustees to understand that either he or Atwater must go, and a few weeks later he sent the board a strong letter with his reasons why the Principal should be removed.[47]

He was dissatisfied, Cooper wrote, first because of his salary, which was not half of what he could get elsewhere. "Hence you cannot depend on any man of Talent being fixed & settled here." But more especially was he dissatisfied with the administration of the college. He charged Atwater with being incapable of enforcing discipline among the students. The principal was guilty of "notorious meanness" in his private character, and Cooper proceeded to repeat tales about Atwater as Atwater had repeated tales about him.

> I state, that although there is no moral turpitude in dealing in horse flesh for the purpose of hiring out these horses to the students—in speculating on oats, or hay, or flour, or fish, to gain money by retailing them—yet this mode of accumulating property, is plainly inconsistent with the character of a man presumed to be devoted to literary pursuits and public instruction: it does not become the Principal of a literary institution.

Finally, Cooper charged Atwater with such gross deficiency in classical and other branches of learning "that it is a disgrace for a man of literary reputation to belong to the same institution with him." Atwater taught geography, for example, by making his students learn by rote the answers to some trifling questions in a book he kept in his hand. At the last examination in the subject

45 Atwater to Green, Sept. 15, 1811, May 11, 1812, Gratz Coll.; Atwater to Samuel B. How, Feb. 13, 1813, transcript by Charles F. Himes, Dickinson College Library.

46 Cooper to Jefferson July 25, 1812, Mass Hist. Soc. *Colls.*, *61*, 171-173.

47 Atwater to Green, June 24, 1815, Gratz Coll.

his students did not know what latitude and longitude are, while Atwater himself had never once asked for the globes which the college owned because manifestly he did not know how to use them.[48]

Cooper's position in this battle was a strong one. His supporters on the board were still a majority. His friends of 1811 never wavered; they were his friends and champions still. He was popular with the students. And he had an international reputation. Yet, in the existing state of American society and religion in 1815, Cooper could not be universally admired and approved, especially not in a private college. Sceptic, Unitarian, Priestleyan, deist, atheist, materialist—these were the charges that were hurled at him throughout his life. He threw them back, giving as good as he got; but this at very best was an undignified spectacle which darkened the reputation of the institution with which he was connected at the moment.

Nor was Atwater without his points. Behind him were ranged the forces of righteousness—the clerical phalanxes, the pious, respectable, conservative laity. They gave him strength. For another thing, he had courage and dignity. When Atwater learned of Cooper's attack on him in the letter to Watts, he informed the board at once that if they countenanced Cooper's charges, he "*had done with the College.*" "The cloven foot is shown," he told his friend Green without humor; "Thos. C. is determined to have the entire management of this College & he has had no serious purpose of leaving, if he could throw me off."[49] The trustees, still closely divided between the two men, read their letters but did no more.

By the end of the summer, however, the situation had become intolerable. Atwater saw no hope for a college which harbored such an enemy to religion as Cooper. Cooper knew his usefulness was severely limited so long as the college must compromise with the parsons' prejudices. In short, neither Atwater nor Cooper could prevail. The day after commencement both men tendered their resignations.

Cooper's friends prepared at once a testimonial which they caused to be widely published. Cooper had brought the college "solid reputation, and greatly added to its means of usefulness." They warmly approved his conduct as a professor and a gentleman.

[48] Cooper to David Watts, June 15, 1815, Hamilton Library, Carlisle; reprinted in *Dickinson Alumnus*, 1938, *14*, no. 1, 20-23.

[49] Atwater to Green, June 24, 1815, Gratz Coll.

"We know that in losing your services, the institution loses much: nor do we expect that the vacancy created by your resignation can be filled with equal talents."[50] Atwater and the clergy were outraged at this. But they had won their objective, though at the price of Atwater's resignation and, indeed, of the college itself, for the next year Dickinson closed its doors.

More than fifteen years later on the street in New Haven, Atwater saw Cooper, who was now president of the University of South Carolina. He did not speak to him. "Thos Cooper has shown himself out what *we* always tho't him to be," Atwater commented at the time, "& he ought long since to have been removed from the station which he disgraces. Poor man, what a dreadful account will he have to give shortly for his impious conduct in this world!"[51] What Cooper thought of his Dickinson experience we do not know. Perhaps he had little time to reflect on it. He was soon riding in mightier storms.

[50] Of the nine trustees who signed this testimonial, six had voted for Cooper in 1811 and two were not then members of the board. The six were Dr. James Armstrong, President, Dr. James Gustine, Judge James Hamilton, the Reverend Mr. J. Campbell, Thomas Duncan and David Watts, both attorneys. Robert Blaine and Edward J. Stiles were not on the board in 1811. Judge Jonathan Walker was absent from the 1811 meeting but would probably have voted for Cooper, for Atwater described him as "a Priestleyan in sentiments but . . . intelligent & correct on many subjects." *American Volunteer*, Nov. 2, 1815.

[51] Atwater to Samuel B. How, May 13, 1831, transcript by Charles F. Himes, Dickinson College Library.

Notes and Queries

Edited by Ralph H. Major, M.D.,* and Dorothy M. Schullian, Ph.D.**

Two Clyster Buttons

Two companion bronze buttons have been presented to the Howard Dittrick Museum of Historical Medicine. The donor, Dr. Henry R. Viets, is unable to throw any light upon their origin. The general design resembles a souvenir button issued by the French Mint on the occasion of the two thousandth anniversary of the founding of the City of Paris. Such a source is also suggested by the appearance of the fleur-de-lis in the background decoration.

These bronze buttons are made of two pieces of metal pressed together, and on the under surface they have a shank and flange for inserting into a button hole. The face of the buttons artistically depicts the practice of colonic irrigation that was fashionable in the seventeenth and eighteenth centuries. On one button administration of the clyster is shown, and on the other the patient is seated on a chamber, with the attendant bending over the heroic-sized clyster (see figure).

Continental artists of the period, without inhibition, portrayed intimate phases of life among the people, such as urination, drunkenness, and vomiting. Well known is the gargoyle on the Freiburg Cathedral, which in rainy weather ejects a continuous stream from the anus of the figure.

An interpretation of the buttons is hazarded in the hope that someone may confirm or refute the opinion. In Molière's *Le Malade Imaginaire*, a student on being examined by the Faculty gives the same answer to all questions:

Clysterium donare,
Postea seignare,
Ensuitta purgare.

This response is apparently satisfactory to the board of examiners. Perhaps these buttons were worn by the player who assumed the rôle of Bachelierus in Molière's play. They may have been widely worn because of the popularity of the play, in which Molière was playing a part at the time of his death.

What is your explanation of the origin of these buttons?

Cleveland, Ohio HOWARD DITTRICK

Notes on Rare or Unusual Books

In forthcoming issues of the *Journal* it is planned to devote some space in "Notes and Queries" to brief accounts of rare books in the field of medicine and science or to books of unusual provenance, and it is hoped that readers will send to the Editor descriptions of such volumes that come to their attention.

* Department of Internal Medicine, The University of Kansas School of Medicine.
** History of Medicine Division, Armed Forces Medical Library, 11,000 Euclid Avenue, Cleveland 6, Ohio.

Two Clyster Buttons

(Howard Dittrick Museum of Historical Medicine)

IN DIOSCORI DIS HISTO RIAM

Herbarum certissima adaptatio, cum earundem Iconum Nomenclaturis, Græcis, Latinis, & Germanicis.

Der Kreüter rechte warhafftige Contrafactur/ erkañtnüsz/vnd Nam:nen/Kryechisch/Latinisch/vnd Teütsch/nach der beschreibung Dioscoridis.

Abſit PRVINA Segeti.

INSIGNE SCHOTTORVM Familiæ.
ANNO CHRISTI Millesimo, Quadringentesimo, Sexagesimosexto.
FRIDERICO ROM. IMP. III. IO. MENTE.

Diui CAROLI V. Priuilegio ad Quinquennium. Anno CHRISTI M. D. XLIII. Argentorati IOANNES SCHOTTVS ære perennius dedit.

Andreæ Cisalpini
Caput Literaliter & Literaliter Andreæ Cisalpini
Patricij Aretini. Romæ die 15 Martij 1595.

We inaugurate the series with an account of a volume obtained for the Historical Library, Yale University, by Mr. E. P. Goldschmidt during the summer of 1952. This is an extremely rare and interesting edition of Brunfels' *In Dioscoridis Historiam Herbarum certissima adaptatio,* printed at Strassburg by Johann Schott in 1543. It is made up of the original Weiditz plates of Brunfels' better known *Herbarum vivae Icones* of 1530, the same woodblocks having been used without text and the plant names given in Greek, Latin, and German. A photograph of the title-page is reproduced herewith. On it one sees the printer's device showing the arms of the Schott family, surrounded by a Latin legend stating that these arms were granted in 1466 by the Emperor Frederick III to Johann Mentelin, the early typographer.

Even more interesting is the autograph of the great Italian physician and botanist, Andreas Cesalpinus, one of the claimants to the discovery of the circulation. Below his signature is an official entry by the Papal Inquisitor permitting Cesalpinus to own and read this book even though the author, Brunfels, was a Protestant whose name had appeared on the *Index librorum prohibitorum.* The note reads:

> Conceditur licentia D. Andree Sisalpini [*sic*] artis medicae doctori, tenendi, et legendi hunc librum. Rome, die 25 Martii 1595. [signed] Fr. P. Joes Saragosa, Magister et Socius Illmi P. Magistri sacri palatii.

The title-page contains two other marks of ownership. On Cesalpinus' death the book passed into the possession of Prince Federigo Cesi, founder and first president of the Accademia de' Lincei of Rome, and on the left of the title is the well known stamp showing a spotted lynx with the legend: "Ex Biblioth. Lyncaea Federici Caesii L.P. March. Mont. Caelii." Opposite this stamp, on the right side of the title, is the etiquette of Cardinal Albani (1692-1779), the learned Vatican librarian. Mr. Goldschmidt acquired the book in the spring of 1952 at an Italian auction. Although the book had belonged to a Vatican librarian, there is no indication that it actually had been in the Vatican Library, a fact probably traceable to Brunfels' appearance on the *Index.*

J. F. F.

Sir William Osler as a Three-Year-Old

Late one afternoon, about one hundred years ago, The Reverend Canon Osler, Rector of the Church of England at Bond Head, Ontario, Canada, was having his usual discussion and argument with the principal of the grammar school, Luke Maxwell Daly. Since both of these gentlemen were university graduates, their talks were inclined to be controversial the greater part of the time. As a matter of fact, it often sounded as though they were sharpening their teeth on each other's bones.

Mr. Daly was opposed to the new public school system, as proposed by Mr. Edgerton Ryerson, and talked at great length about the "far-reaching effects." "A smattering of knowledge," he often stated, "is a dangerous thing for both student and unqualified teachers."

During a brief pause on that particular afternoon, a small fist was heard rapping on the Rector's study door. Mr. Daly jumped up exclaiming, "That's my old friend, Willie. I'll let him in."

By the time Mr. Daly had returned to his chair, hand-in-hand with Canon Osler's three-year-old son, Little Willie had started his innumerable questions, was receiving the correct answers, and was looking around the room for more interesting topics. Canon Osler listened and finally announced with considerable pride, "I intend to make a preacher out of that lad." But Mr. Daly, perverse Irishman that he was, shouted, "Never! It would be a crime to put this child in the Church. He has an inquiring mind. He is too intelligent. He would make a grand doctor."

Turning to the small boy, Mr. Daly asked, "Wouldn't you like to be a doctor, Willie?" The youngster laughed delightedly and replied, "Me, Doctor Willie? Me, Doctor Willie?"

It was at that precise moment that the idea of becoming a doctor entered the mind and heart of William Osler. In this idea he was aided and abetted by Luke Maxwell Daly as long as they all remained at Bond Head.

Toronto, Ontario MRS. M. DALY HOPKINS

International Academy of the History of Pharmacy

Professor George Urdang has been appointed first President of the International Academy of the History of Pharmacy, which was founded on his seventieth birthday, 13 June 1952. He in turn will appoint the first members of the Academy. The organization has as its main purpose the stimulation of international co-operation in the history of pharmacy. Its address is Alexanderstraat 11, The Hague, Holland; its Secretary is Dr. P. H. Brans, Heemraadssingel 122, Rotterdam-C., Holland.

Historical Gleanings

In *Symposium* (May, 1952, *6*, 241-245) Norbert Fuerst and S. I. Mintz provide a useful bibliography of items published during 1951 which deal with the relations of literature and science.

Sir William MacArthur upholds in *Transactions of the Royal Society of Tropical Medicine and Hygiene* (1952, *46*, 209-212 and 464) the antiquity of the rat in Palestine and its responsibility in the plague of the Philistines which is described in 1 Samuel: 5, 6.

Prof. A. Ananthanarayana Ayer of Stanley Medical College, Madras, explains in *The Madras Medical Journal* (April, 1951, *n.s.* 2, 51-52) the comparison of the embryo in the second month of pregnancy to a kazhachi (*Caesalpinea bonducella*) fruit on the creeper. Like the embryo, this fruit is a small round mass. But in addition, its flattened ovoid covered with spines and containing the seed recalls the chorionic vessel covered with villi and containing the foetus.

Major H. P. E. Pereira describes in the *Journal of the Society for Army Historical Research* (London), Museum Supplement No. 12 (Summer, 1952, pp. xxiii-xxiv), the new R.A.M.C. Historical Museum at Crookham. The Museum has been established to give the young National Service

man an idea of the history of the Medical Corps. Instruments, uniforms, relics of the South African and both World Wars, a diorama of means of transport ranging from ox carts and mule litters to jeeps, helicopters, and hospital ships make vivid for him the development of the Corps. Duly commemorated are the thirty-one V.C.'s won by the Corps from the institution of the award in the Crimea to the year 1945. The exhibit includes a letter of Florence Nightingale and a set of dental instruments which belonged to Napoleon in exile.

Source of Inscription on Trudeau's Statue at Saranac

Mrs. Ruth W. Worthington, Librarian of the Saranac Lake Free Library, Saranac Lake, New York, wishes to find the source of the quotation which is inscribed on the statue of Edward Livingston Trudeau at Saranac:

GUÉRIR QUELQUEFOIS—SOULAGER SOUVENT—CONSOLER TOUJOURS

Tradition has it that Dr. Trudeau had borrowed it from some French writer on tuberculosis but others attribute it to Trudeau himself. If any of our readers know the origin of the quotation, will they kindly get in touch with Mrs. Worthington.

Centenary Celebration Honoring Jacobus Henricus van 't Hoff

On the occasion of the centenary of the birthday of Jacobus Henricus van 't Hoff, a memorial meeting was organized on 3 August 1952 by the Nederlandse Chemische Vereniging (Dutch Chemical Society) in van 't Hoff's former laboratory at Amsterdam. Memorial lectures were given by Prof. H. J. C. Tendeloo, Prof. J. A. A. Ketelaar, and Prof. Dr. J. P. Wibaut. An exhibition of documents, photographs, manuscripts, publications, and scientific homages was arranged by Dr. Maria Rooseboom. The exhibition, in which many valuable souvenirs lent by the van 't Hoff family were displayed, was shown afterwards in the Library of the Technical High School at Delft and the National Museum of the History of Science at Leiden.

Another Tribute to Dr. Sigerist

Dr. Henry E. Sigerist gave the twenty-first in the series of Heath Clark Lectures in November at The London School of Hygiene and Tropical Medicine under the auspices of the University of London. In this connection Miss Heath, daughter of Charles Heath Clark who founded the distinguished lectureship, chose to commemorate the occasion by presenting to Dr. Sigerist a gold and enamel medallion which had been given to her father by business associates when he retired from the City. Professor Ian McCracken made the presentation at the conclusion of Dr. Sigerist's final lecture—this through the good offices of Dean James Mackintosh who had received the medal from Miss Heath.

Dr. Rosen Honored by Student Society

Dr. George Rosen, Professor of Public Health Education, Columbia University School of Public Health, has been elected Honorary President of the Osler Society at the Medical Faculty, University of Western Ontario.

Dr. Rosen has been invited to address the annual banquet of the Society on 11 March 1953. The subject of his address will be "Economic and Social Policy in the Development of Public Health." On the occasion of his visit Dr. Rosen will also attend the staff seminar and discuss with the staff the nature and problems of public health education.

Dr. Sarton's Rosenbach Lectures

Dr. George Sarton, Emeritus Professor of the History of Science at Harvard University, presented a series of three lectures at the University of Pennsylvania under the A. S. W. Rosenbach Fellowship in Bibliography on 16, 23, and 30 January 1953. Dr. Sarton's subject was "The Appreciation of Ancient and Medieval Science in the Renaissance," the three lectures being entitled: "The Medical Humanists," "The Naturalists. The Love of Nature vs. the Love of the Classics," and "Mathematics and Astronomy as Understood by the Humanists of the XVIth Century."

American Association of the History of Medicine

Program — Annual Meeting

at the Ohio State Museum, Columbus, 10-12 April 1953

Friday, 10 April. After morning registration there will be a tour of inspection of the Museum and Health Center; during the afternoon a joint meeting will be held with the Ohio State Archeological and Historical Society. The evening session is to be devoted to a symposium on the history of Mexican medicine arranged by Drs. Howard Dittrick and Chauncey Leake.

Saturday, 11 April. General papers by members of the Association and invited guests both in the morning and afternoon. At 3:30 Dr. Dorothy M. Schullian will deliver the Garrison Lecture on "An Introduction to the History of Medicine, 1498." There will be a business meeting at 4:00 and the annual banquet at 7:00 at the Fort Hayes Hotel (the headquarters hotel).

Sunday, 12 April. A morning session of general papers will be followed by a special address on Michael Servetus (1514-1553) by Professor Charles Donald O'Malley.

Death of Dr. Arturo Castiglioni

As this *Journal* was going to press, the Editor received the sad news of the death of Dr. Arturo Castiglioni on 21 January in Milan after a brief illness.

Book Reviews

JOHN FLEETWOOD. *History of Medicine in Ireland.* Dublin, Browne and Nolan, Ltd., 1951. xvi, 420 pp. 21 *s.*

To most of us, perhaps, the history of medicine in Ireland begins and ends with the Dublin school of clinical medicine made illustrious by Colles, Graves, Stokes, Corrigan, and a few others whose names appear in every history of medicine. And yet the Gaelic medical tradition is as ancient, and in many ways as interesting, as that of any other country. Writing, as he informs us, primarily for the layman but also for his colleagues, Dr. Fleetwood presents us with the first comprehensive though not exhaustive narrative of Irish medical practice throughout the centuries from its inception among the ancient Druids to its accomplishments in the present day. And for those who may wish to pursue the subject through a wider range or in greater detail, he has provided an excellent bibliography—not the least valuable feature of this informative volume.

Unfortunately the records of early Irish medicine are fragmentary; most of them lie *perdus* on the shelves of libraries in the universities and monasteries of Western Europe patiently awaiting the labors of some scholar with the learning and leisure to reveal them to us. How interesting would it be to learn something of the adventurous lives and doings of the Irish medical *peregrini,* those intrepid wanderers over the face of Europe—O'Glacan who left Donegal to occupy the chair of physic at Toulouse and Bologna; Bernard O'Connor, physician to King John Sobieski of Poland; John O'Higgins, physician to Philip of Spain; Georges Mareschal, son of an Irish officer in the armies of Louis, who enhanced the lowly trade of the surgeon to parity with the haughty Medical Faculty of Paris. But the writing of the story of these men and of others like them in the Irish *diaspora* lies in the future. It must await the labors of scholars equipped with the knowledge of Gaelic, Latin, and English as well as of medicine—no easy task for the medical historian.

In the first of twenty-one chapters Dr. Fleetwood introduces us to pre-Christian medicine in Ireland. This was a mixture of folklore and doubtful facts interfused with pagan and Christian superstitions. Because of the custom of cremation, it is difficult to secure evidence of surgical skill; but in a few instances it is possible to diagnose some bone and joint conditions which afflicted the early inhabitants. There are skeletons in which the teeth show poor resistance to wear; pyorrhea, caries, and bone abscesses are found constantly. Chronic arthritis appears frequently, and the skiagrams of a woman's skeleton over two hundred years old disclosed mastoiditis on the right side.

As in all primitive cultures the ancient Irish physicians belonged to the Druidic or priestly cast. Their medical lore was handed down orally and, unfortunately for the historian, perished with them. Nevertheless, Dr.

Fleetwood's researches were rewarded with enough evidence to afford us some measure of insight into their beliefs and practices.

St. Patrick arrived in Ireland in A.D. 432. With him began the seeding and after him came the flowering of sanctity and learning, sacred and profane, which from the sixth century to the twelfth was to make Ireland's scholars the Doctissimi Magistri of the Europe which was to be. The first hospital in Ireland was staffed by nuns and was opened when St. Patrick enrolled St. Brigid and her companions, bidding them to collect, nurse, and minister to the sick. It appears that there were recurring severe and widespread plagues, together with much leprosy, or what was diagnosed as such, in medieval Ireland, and one of the greatest monastic works of mercy was the establishment of many leper houses. It is probable that some surgery was practised in these monastic institutions, for recent research has unearthed a few trephined skulls, one with the opening in the left parietal, another, that of a child, with the opening in the right frontal bone.

Curiously enough, the Renaissance which began in Italy in the fourteenth century had no influence upon Irish medicine for many years. From about the tenth century until the foundation of a formal medical profession, medicine in Ireland was practised by hereditary physicians whose families served the nobles and chieftains. Younger members learned from their elders and were expected to carry on the family tradition. In his *Confessio Authoris,* published in 1648, van Helmont wrote, "The Irish nobility had in every family a domestic physician whose recommendation was not that he came loaded with learning from the college, but that he was able to cure disorders; which knowledge they have from their ancestors by means of a book belonging to particular families that contains the marks of the several diseases, with the remedies attached; which remedies were *vernacula,* the production of their own country—for this reason the Irish are better managed in sickness than the Italians who have a physician in every village." This complimentary opinion of van Helmont was not entertained by Dermond O'Meara who in a letter written in 1619 to the Lord Deputy, Sir Oliver St. John, observes, "There are certainly more persons in Dublin at the present day practising the Art of Medicine than any other art, yet there are very few of them who have the six qualifications which Hippocrates requires in a Medical Doctor. Here, not only cursed Mountebanks, ignorant barbers, and shameless quack compounders, but also persons of every other craft whatsoever, loose women, and those of the dregs of humanity who are either tired of their own proper art and craft or inflamed with an unbridled passion for making money, all have free leave to profane the holy temple of Aesculapius. Here might not one justly exclaim in the words of the poet,

> 'Here are those
> Who, groping in the dark, are licensed still
> To rack the sick, and murder men at will.' "

To the medical reader, the most appealing part of Dr. Fleetwood's book will be, no doubt, his account of Irish medicine from the seventeenth century to the present day and especially the second half of the nineteenth century during which flourished the Golden Age of clinical medicine, for in this climate of opinions we feel ourselves most at home. Successive chapters unfold the story of Trinity College and the Royal College of Physicians, the Royal College of Surgeons, the Apothecaries, the Dublin School of Midwifery, the Belfast School, the famous hospitals, medical schools, and professional societies.

For his own countrymen, as well as for us, Dr. Fleetwood has accomplished a task which is a tribute to his scholarship and industry and which may well inspire, in the not too distant future, further research by others in the field of Irish medical history. In taking leave of Dr. Fleetwood's book, we trust that this may not be the last of his contributions to the medical history of the Gael.

Providence, Rhode Island JOHN E. DONLEY

Changing Patterns of Scholarship and the Future of Research Libraries—a Symposium. Philadelphia, University of Pennsylvania Press, 1951. x + 133 pp. $2.50.

RESEARCH libraries, particularly those associated with universities, face constantly changing needs, not only in the field of the humanities and social sciences, but more urgently in the vast and growing disciplines under the general term of the natural sciences. The ever-expanding demand for material, comprehensiveness versus selectivity in the building up of collections, libraries and librarians as active participants in research, and the education of the research librarian himself are some of the topics of timely interest considered by scholars at the celebration in May, 1951, of the two hundredth anniversary of the establishment of the University of Pennsylvania Library. The remarks made at the time, as well as the discussion which followed the individual papers, have now been issued in a book of considerable value both to librarians and to the research literature associated with their interests.

Some of the points brought out by the speakers may be mentioned. There is now a demand, for instance, for material that in the past did not attain the dignity of "literature," such as fugitive writings, comic books, "throw-away" advertising pamphlets, obscure local newspapers, and much else that was considered formerly to be trivial trash. The amount of "good" material, moreover, has vastly increased in recent years. In natural science there are 150,000 to 200,000 papers published each year which need to be scanned, as well as approximately 5,000 scientific books.

How to acquire, to catalogue and cross index, to find the large funds needed to maintain a well rounded collection and the personnel trained to make the literature quickly available are problems that face all university

librarians today. To some, the solution can lie only in a doctrine as expressed by the Librarian of Congress that "the national interest is so affected by the resources of the major research libraries of the country that federal support for their adequacy in the growth and feeding of scholars is reasonable. And by scholars in this sense I would include all kinds of technical experts who might potentially be drawn upon by the Government [p. 39]." On the other hand, without the use of Federal funds, economies can be put into practice, often leading to a greater efficiency of operation than previously realized. The expansion of inter-library co-operation in regard to indexing, cataloguing, storage and acquisition, the use of deposit libraries for rarely called for material, and a diversification of interests so that there results a minimum of duplication, particularly of expensive and rare items, are some of the methods suggested by various speakers.

This small book, containing many provocative ideas, should be read and pondered by all individuals associated with research libraries, including the administrative staffs of universities.

Boston, Massachusetts HENRY R. VIETS

WILLIBALD KIRFEL. *Die fünf Elemente insbesondere Wasser und Feuer. Ihre Bedeutung für den Ursprung altindischer und altmediterraner Heilkunde. Eine medizingeschichtliche Studie . . .* (Beiträge zur Sprach und Kulturgeschichte des Orients. Herausgegeben von Prof. Dr. phil. Dr. iur O. Spies. Heft. 4) Walldorf-Hessen, Verlag für Orientkunde Dr. H. Vorndran, 1951. 48 pp.

CHEMISTRY arose from two primary sources: the practical arts and the speculations made from time to time as to the nature of matter. Some of the earliest evidence of the speculative side of ancient chemistry is found in the records of Greece, India, and China. These first serious efforts to account for the origin and changes of matter show a remarkable similarity, although the development in these sources may have been independent. The evolution of the theory of elements is perhaps the best example. The Greek thinkers, beginning with Thales about 600 B.C., were primarily interested in an explanation of the whole cosmos. In the course of their speculations they became especially intrigued by what may be termed the states of matter. The elements were embodiments of these states of matter. To the Greeks earth, water, and air represented solid, liquid, and gas. Fire, the principle of heat, or motion was soon added; the elements were shown to be mutually interconvertible. These basic ideas were changed in different ways by various philosophers, but were finally brought together by Aristotle (384-323 B.C.) in a synthesis that was to persist until the eighteenth century. Aristotle assumed that everything was composed of a prime matter. This matter, however, was entirely without form and only when form was impressed on it did it have distinctive properties. Thus all material was produced by the interaction of matter and form. The opposing qualities

of heat, cold, moisture, and dryness were used and by combining these in pairs the four elements fire, air, earth, and water were obtained. To these four material elements a fifth, immaterial, one was added—quintessence or the ether. An early Hindu theory which describes nine universal constituents—earth, fire, water, air, ether (akasa), time, space, soul, and manas —is known. Its relationship to Greek sources is uncertain. The Chinese set forth five elements that change into one another in an unending cycle: metal, water, fire, wood, and earth. The theory probably reached China later from Greek sources via India with the introduction of Buddhism.

This small book by Dr. Willibald Kirfel of the University at Bonn traces back to Greece and India the concept of the four or five elements and their relationship to the various parts of the body. He shows that this actually was only an extension of an earlier idea found as far east as Bali, that the balance of two elements, fire and water, is essential for health. These two elements in turn were connected with the differentiation of the two sides of the body, the right side being male and the left female. The theory survived even the extension of four elements and occurs in Greek medical writings in relation to phlegm and bile. These concepts, Dr. Kirfel believes, are all derived from the same source, a pre-Aryan culture which at one time covered the entire area from the Mediterranean to India. A considerable body of evidence is cited in support of the views presented.

The work is divided into ten short individual chapters which make reading easy, and the argument is developed logically and rather convincingly. Although the idea of the pre-Aryan culture is not accepted by all scholars, this is a stimulating theory, and should encourage further investigation in the field.

Numerous references at the ends of the chapters and a name index make the work more valuable.

Philadelphia, Pennsylvania HERBERT S. KLICKSTEIN

O. NEUGEBAUER. *The Exact Sciences in Antiquity*. Copenhagen, Ejnar Munksgaard. (*Acta Historica Scientiarum Naturalium et Medicinalium*, vol. IX); Oxford, Oxford University Press, 1951; Princeton, Princeton University Press, 1952. ix + 191 pp. + 14 plates. $5.00.

PROFESSOR Neugebauer's latest book represents the printed version of his Cornell University "Messenger Lectures on the Evolution of Civilization," delivered by him at Cornell in the autumn of 1949. Since these were designed for non-specialists as well as specialists in other fields, the book will appeal to a wide audience anxious to know something of the results of recent research on ancient exact sciences. By "exact sciences" in this context the author means mathematics and astronomy, and inasmuch as no discussion of the latter could hope to present a balanced picture without including classical astrology, there are numerous references to it. The author further restricts himself to non-Greek accomplishments in these fields since

Greek science is comparatively well covered in numerous volumes. Yet in spite of these restrictions, the reader will be pleased with this "slight synthesis" at the hands of one who has spent many patient years at the difficult task of being an ultra-specialist.

In the Introduction he makes it plain that he will not deal with the history of ancient medicine or natural sciences but at the same time emphasizes the close connections between medicine and astronomy in the Greek medical schools, for example, and the effect on medieval medicine of Hellenistic astrology. But even more important to anyone interested in the history of the ancient world is the fact that astronomy offers one of the most potent tools for the establishment not only of pure chronology but also of the history of intercultural contact, and this because the transmission of technical astronomical knowledge requires what might be termed a "penetrating" contact. Ptolemy's epicyclic planetary theory cannot be transmitted in the manner of an old wives' tale, passing between traders over a cup of beer. Further, since it is most improbable that parallel astronomical systems, complete to many details, should develop independently in diverse cultures and because of the many inherent checks available to the investigator, it follows that the study of these schemes often throws light on non-astronomical history.

The author disarms us at the beginning by disclaiming any effort at historical "synthesis"; and yet, precisely because it is carefully qualified, this book is a synthesis in the best sense of that term. The pitfalls involved in synthesis could not be more apparent than to a specialist like Professor Neugebauer, and accordingly when he puts parts of his work together he knows whereof he speaks. We are thus repeatedly warned that only part of a history has been laid before us, and in fact, his primary purpose has been "to convey to the reader some of the fascination which lies in active work on historical problems."

In Chapter I we read of the development of number systems and their representations. The great important steps are emphasized (such as the development of "place value notation" by means of which all numbers can be represented by a very limited number of symbols) and we see the negative, restraining effect of poor number symbols and clumsy operational techniques as in the case of the Egyptians.

Chapter II summarizes the salient characteristics of Babylonian mathematics. The "Old Babylonian" period (roughly 1800 to 1600 B.C.) is distinguished from the "Seleucid" period (roughly 300 B.C. to the beginning of the Christian era). The mathematical development from earlier to later period is marked by fundamental changes in notation (the sign for "zero," for example, first appears in Seleucid texts) and in the extendedness of the computations, the latter trend very probably motivated by the requirements of mathematical astronomy which was also a Seleucid development. One of the most striking results of this discussion is the light it throws on the old geometry *vs.* algebra controversy. The blinded glorification of Greek ge-

ometry has so befogged the total picture of ancient mathematics that it is more than difficult to restore a proper balance. Very few purely geometrical cuneiform tablets have been found, and all sorts of speculations are based on this fact. What seems to be less realized is that geometrical problems of the type confronted in daily life are capable of algebraic-arithmetic solution, and it was this approach that the Babylonians chose. It is only on a much higher level that geometry in the sense of theorem and proof is relevant to practical problems.

Chapter IV gives us a picture of the relatively minor accomplishments of the Egyptians in mathematics and astronomy. Said in this way, it might appear to be a waste of time and yet it is quite the opposite. By studying this example we see the importance of a flexible and growing numerical notation in the development of the exact sciences. Conversely, the Egyptian story illustrates the stagnation which results when a clumsy system is in use. The chapter goes a long way toward defining the importance of studying this primitive mathematics, for, after all, it represents a necessary stage in the development of that science. Yet an equally important result is the nullification of many erroneous impressions, still current, concerning deep mathematical and astronomical achievements by that civilization.

But for this reader, the most exciting chapters are: III. The Sources: their Decipherment and Evaluation, V. Babylonian Astronomy, and the final chapter, VI. Origin and Transmission of Hellenistic Science. This may be partly due to the fact that these chapters contain newer material—indeed, most of it unique—while the author himself has recorded a large part of the other chapters in other publications. The first chapter mentioned is important because it reminds us of the immense difficulties facing the serious investigator of virtually anything ancient. It is partly a success story due, on the one hand, to the labors of countless humans who have had the energy to preserve documents for posterity, and on the other to the modern auxiliary sciences such as papyrology which make possible the solution of many earlier enigmas. But it is sad indeed to be confronted with the other half of the story. The lack of modern editions of virtually all medieval astronomical works, the havoc raised by modern publishing methods whereby original symbols, drawings, and abbreviations in the MSS are too often lost, the conditions in the overworked museums whereby vast numbers of artifacts of every description are lost in the bowels of marble monsters—many not even catalogued—all these conditions cause one to marvel at what has been accomplished. Add to these difficulties the fact that important compilations such as Euclid's *Elements* and Ptolemy's *Almagest* render immense groups of earlier literature superfluous by their popularity, never to be seen again, and one realizes what minute fragments of history we actually control.

The author is now completing an edition of astronomical cuneiform texts, and in the chapter on Babylonian astronomy we glimpse a few of the

results of that work. The decipherment of the elaborate numerical schemes by which lunar and planetary problems were solved cannot be described here, but one result can be mentioned. Whereas Greek planetary theories proceeded from cosmological models of which we hear much, and had as their goal the elements of the complete planetary orbits, the Babylonian outlook was quite different. Having the complete orbit, the Greek astronomer could interpolate for isolated phenomena such as first and last visibilities and stations. Babylonian astronomers started from the opposite end, evolving numerical schemes for predicting the isolated phenomena and only then interpolating the complete orbit. Further, there is no real evidence that they took the last step to geometric models in this reversed process.

The last chapter on the origin and transmission of Hellenistic science summarizes what the author feels is reasonably sure at this date. It also mentions problems which are not yet solved. It should be obvious by now that the interrelationship of pre-Greek, Greek, and Hellenistic science is a problem of a different character than the simple nettle it was once assumed to be. It is the sixty-four-dollar question in the history of ancient science, and we can be certain that it will not be answered in any one volume. Recent research has demonstrated that the filiations once assumed to be essentially exhaustive seem now to be pitifully over-simplified. Yet the histories on these rotting piers continue to be written, and so they must occasionally topple over. One example must suffice. One of the oldest and most persistent bits of folklore places the origin of astrology in Mesopotamia; the references to "Chaldeans" in this context are countless. Reputable Greek and post-Greek literature perpetuates the account. While not denying nor even doubting the importance of these reports, the author points out that *less than ten horoscopes from cuneiform tablets* have been found, and even fewer texts containing astrological doctrine (p. 161). In light of the fact that hundreds of thousands of tablets have been unearthed (though admittedly many not yet even catalogued), and many times ten astronomical texts in particular, should historians accept this account of the origin of astrology? The only sensible answer requires that the question be kept open, at least until a larger sample of cuneiform literature has been evaluated. This question is in turn related to other questions such as the relative importance of astrology in the development of astronomy, and vice versa. The author points out that in light of the paucity of source material on this "Chaldean art," the theory by which astronomy is made to originate from astrology stands on rather weak piling, to put it mildly. Again the point is that until much more source material is re-excavated from museum basements, historical synthesis is that much weaker.

Readers will find uncounted gold in the bibliography and notes appended to each chapter; indeed, the notes contain some of the most important remarks. Fourteen plates, including a fine reproduction of a page from the *Book of Hours* of the Duc de Berry, are included in the book

which is handsomely printed in all respects. Finally, but not least important, there is an excellent index, a list of the zodiacal signs, a chronological table of names with approximate dates, and a diagram which shows at a glance the relative chronology of the peoples involved in the discussion.

Providence, Rhode Island WILLIAM D. STAHLMAN

CARL ROEBUCK. *The Asklepieion and Lerna.* Based on the Excavations and Preliminary Studies of F. J. De Waele. Princeton, N. J., The American School of Classical Studies at Athens, 1951. xi + 183 pp., Plans A-E, 69 pl. $10.00.

THIS sumptuous volume, a large quarto, is one of the long series of publications dealing with the excavations carried on for nearly half a century at the site of the ancient and famous city of Corinth. To its location on the narrow isthmus between the Peloponesus and the rest of the Grecian mainland, Corinth owed much of its wealth and its glory. As if the Isthmus, washed by the sparkling waters of the Gulf of Corinth on the west and by the Saronic Gulf on the east, were not by itself spectacular enough, nature herself chose to erect a monument to her handiwork in the lofty, isolated eminence of Akrocorinthus, rising nearly two thousand feet above the sea. Around its foot toward the north the ancient city clustered. As the Isthmus itself was a natural fortification, so also the lofty eminence above it was a watch tower which commanded a view of nearly all the most famous centers of Greek civilization—a panorama perhaps without equal for its physical beauty and its cultural implications.

Because of its strategic position between two seas and two mainlands it is easy to see how a small state amidst lesser neighbors was from an early time in position to profit from revenues derived from traffic both by sea and land. Its wealth and luxurious expenditure upon embellishments of the city became proverbial; its central position designated it as the seat of one of the great Greek racing festivals, the Isthmian Games, vying with those of Olympia and Delphi.

Such a center of the Greek world naturally demanded a temple to the god of health Asklepios—whose name the Latins reproduce in the familiar form Aesculapius—and it is to the recovery of his shrine from almost completely obliterated traces that this volume is devoted. As a piece of technical archaeological research the work is deserving of the highest praise, although the general or medical reader of today may complain that the technical aspects of this science have been pushed to a degree of refinement that almost excludes him from easy grasp of text and plans. Such a reader craves not a little which the excavator and restorer feel no obligation to supply, such as historical and geographical settings, as well as a more comprehensive description of the cult of the god itself. In short, the book is not written for him, and it would be beside the point to raise such a complaint

if the volume had not been submitted for review to a journal whose readers are not archaeologists. Thus, for example, the slight chapter on the Cult of Asklepios gives a very minimum of what the contemporary physician or layman would like to know about the treatment of ailment and the cures effected. But again this is not the purpose of the volume. More of this kind of information than is elsewhere set down may be learned or inferred from the curious and interesting votive offerings to the god made by presumably recovered patients. Specimens of them in photographic reproduction are listed on the plates at the end—votive torsos, ears, and eyes (35), breasts, genitals, hands, arms (34-38), legs and feet (41-43).

The problems that confront the excavator of Corinth can be grasped most easily when it is recalled that the terrain was occupied continously for something more than 2,500 years of recorded human settlement. The city grew to a first flourishing period down to the middle of the second century B.C. when it was captured and razed to the ground by the Roman Mummius. It remained presumably uninhabited for a century before it was re-established by Julius Caesar and again flourished, perhaps more prosperously than ever, in the Roman imperial period. It suffered pillage and destruction again at the hands of Alaric and the Visigoths at the end of the fourth century, from which it apparently never recovered to any considerable significance, although the territory seems to have been scantily occupied throughout the Byzantine empire.

If this book, or this meagre notice of it, should stimulate the curiosity of readers to know more than it aims to supply concerning the religious and medical aspects of the worship of Asklepios, an admirable and recent resource is at hand in the two volumes of Professor and Mrs. Edelstein (*Asclepius*. Baltimore, Johns Hopkins Press, 1945).

New Haven, Connecticut GEORGE L. HENDRICKSON

W. R. BETT. *Osler: The Man and the Legend*. London, William Heinemann, 1951. vi + 125 pp. 15s.

THIS small volume does not purport to be a biography of Dr. Osler in the ordinary sense but has been written, the author insists in his introduction, to give a new approach to him and thus dispel the "Osler legend" which has created for him an "Olympian setting" and "raised his everyday utterances to the status of aphorisms." The reviewer finds a certain incongruity between this preface and the body of the work in which, to exaggerate but slightly, scarcely a page is lacking in high praise of the character and accomplishments of the subject, until toward the end even the author admits that it is extremely "difficult to disentangle the man from the legend."

In carrying out his plan the author has deviated from chronological biography and after a brief chapter on Dr. Osler's academic career has devoted himself to recounting Osler's manifold activities, to each of which

he has assigned a separate chapter. He ends with an estimate of "the Man." The major chapters are properly devoted to Dr. Osler's strictly medical activities. The first of these deals with his extensive studies of the widely prevalent bacterial diseases of his most active period: typhoid fever, lobar pneumonia, and tuberculosis, emphasizing his numerous publications and, in the tuberculosis section, his anti-tuberculosis activities. The next chapter deals with his interest in syphilis and, in particular, syphilitic aneurysms of the aorta, and is followed by a chapter on his study of maladies of the heart, especially angina pectoris and malignant endocarditis, a subject in which he became "one of the greatest authorities of his generation." The medical chapters end with one on Osler "Firsts" which have earned him eponymic commemoration.

In the succeeding chapters the author pays what seems to the reviewer justifiable tribute to Dr. Osler as a clinician of diagnostic acumen, as a natural and inspiring teacher without a par when a patient was before him, as an ardent and intelligent bibliophile, as a medical historian for whom the past still lived, as a classical scholar (though confessedly "not in the Oxford sense"), and as a delightful essayist.

The final chapter concerns 'the Man' himself—a person of infinite magnetism and charm with a genius for making friends, of great humanity and an innate sense of duty to his fellow men, with a love for youth, and with a puckish sense of humor. Here, too, the reviewer can agree with the author's judgment, but after almost a decade of observation of 'the Man' in various relationships, he is compelled to say that either Dr. Osler changed much in character after going to Oxford—a change which was not noted on his return to this country—or else the author must have relied too much on a misguided imagination to find "some people who were inclined to think him too gushing and too much addicted to back-slapping." It just couldn't be.

The reviewer has noted but one factual error in the book. The unfortunate quotation from Trollope suggesting chloroform for men of sixty was made in his farewell address at Johns Hopkins University and not at a farewell dinner in New York.

New Haven, Connecticut CHARLES H. BUNTING

GILBERT HORRAX. *Neurosurgery. An Historical Sketch.* Springfield, Illinois, Charles C Thomas, 1952. ix + 135 pp. $3.75.

THIS modest-looking volume presents in compact form an amazing amount of information on the history of neurological surgery.

The author reviews in the first chapters the earliest efforts in cranial surgery, beginning with the prehistoric period when records did not exist. Deductions regarding the purpose of the operations of this era had to be drawn from a study of the anthropological specimens alone. In succeeding

chapters he describes the great influence that the Hippocratic and Galenical writings have had on surgery for many centuries. In reviewing the steps that were taken by these early surgeons, he frequently quotes directly from their writings. These quotations are well chosen and accurately describe what was accomplished.

In selecting the outstanding figures in the medieval and renaissance periods the author has confined his remarks to a few of the most prominent surgeons of those days and has omitted for the most part the great anatomists whose work not only laid the foundation for modern neurological surgery, but was of inestimable value to surgeons like Paré and those of the pre-Listerian period. Apparently the author has intentionally referred only in passing to the men in the allied sciences of neurology, neurophysiology, and neuroanatomy and has limited himself to the work of the surgeons.

In his last chapter Horrax has given an admirable picture of the development of neurological surgery in modern times. He has called attention to the numerous valuable contributions made by the father of neurological surgery, Sir Victor Horsley, and has pointed out that these were the foundation stones on which Harvey Cushing built a world-wide school of neurosurgery. The author's appraisal of Horsley's work is excellent, but he makes it perfectly clear that present-day neurological surgery actually began with the work of Harvey Cushing. He enumerates many problems in neurological surgery to whose solution Cushing contributed and in which, in many instances, he did pioneer work. These contributions include technical, pathological, and clinical advances with special emphasis upon electrocoagulation. He points out that success in modern neurological surgery became possible only when the meticulous technique that Cushing developed was adopted.

Though Horrax has devoted much space to the work of Cushing, he has given credit also to valuable contributions by others, emphasizing in particular the great advances made possible by Dandy's epoch-making discovery of ventriculography. In addition, he has pointed out the numerous advances that have been made in neurological surgery in the few years since Cushing's death—for instance, the radical treatment of brain tumors, the use of the upright position in the operating room, the extensive use of blood transfusion, better control of hemorrhage by stiptics, and the introduction of angiography.

This book gives a fascinating picture of the development of neurological surgery and its future possibilities. It is to be regretted that there is no index, but the book is well written and is a most valuable contribution to the history of this subject. It should be of great interest to those working in this field as well as of importance to all who may be planning to take up this challenging specialty.

New Haven, Connecticut ERNEST SACHS

LAWRENCE BABB. *The Elizabethan Malady: A Study of Melancholia in English Literature from 1580 to 1642.* (Studies in Language and Literature). East Lansing, Michigan State College Press, 1951. ix + 206 pp. $3.50.

THIS book stems from the fact that the Elizabethan age evidenced a great interest in melancholy and the nervous diseases. Numerous psychological writings (and translations of such) and literature itself testify to this fact. Mr. Babb's book is in many ways a model of scholarly honesty. It may be said, especially with reference to the literary sections, that his materials have not always yielded to clear outline and statement. But those who have themselves taken a hand in initiating modern studies in the field of the history of ideas will be the least critical of any faults in this volume.

The first chapters are certainly enlightening. With a prelude on the three souls, the four humors, the vital spirits and the animal spirts, Mr. Babb sets forth the Elizabethan theory of melancholy as he gathers it from a kind of "ethical" literature—perhaps better described as "psycho-medico-ethical"—a type which may be said to culminate in Burton's *Anatomy of Melancholy* (1621). Among the writers listed in his full and interesting bibliography, he makes chief use of Elyot, Du Laurens, Barrough, Bright, Burton, Coeffeteau, and Lemnius. Thomas Newton's translation (1565) of the last named may especially please the literary reader and come even as a discovery. Mr. Babb's book generally provides good quotation.

The Elizabethan theory of melancholy had both physical and psychological sides, but it favored strongly (in contrast to modern psychology) the physical interpretation. At least we may say that for the Elizabethans there was always a physical malady there, ready to take a hand in any vicious circle one might have to start. It was their opinion that "the melancholic malady is fundamentally a physical condition." They might define the disease as "a psychosis caused by a black bilious humor and characterized by morbid depression, continuous or recurrent." The useful term "physiological psychology" gradually enters Mr. Babb's text and sticks. The Elizabethan psychologists saw man as a physiological fact. They were the real materialists. What we call an "emotion they called a "motion."

Their physiology of melancholy might go something like this. Black melancholy is one of the four humors, produced by the digestion of food (blood, choler, phelgm are the other three—red, yellow, and white respectively). Melancholy has its seat in the spleen, which it in turn nourishes. A certain amount of this thick, sour semi-excremental humor is essential to physical well-being, since melancholy nourishes bones, gristle, and sinews. (The bones of *Ash Wednesday* chirp about these pages.) The fires of excess turn this cold, contractive humor into a dry ash which seems to blow up and down the body. This pathological condition is described as "melancholy adust" or "burnt choler." Autopsies performed on melancholy remains have revealed "insteed of a heart . . . nothing but a drie skinne like the leaues in Autumne." In physical appearance the melancholy are lean, dry,

lank, of a swarthy ugliness. They are likely to be very hairy. Let us quote Lemnius, who says that melancholy men are "leane, dry, lank . . . crokenayled . . . the face becommeth pale, yelowyshe & swarty . . . As touching the notes & markes of their minds, they are churlish, whyning . . . obstinate, greedy . . . they vse a certaine slow pace & soft nyce gate, holdinge down their heads, with countenaunce & loke . . . grim and frowninge." The melancholy may have ringing in their ears, may hear bells or hissing sounds. Their hard, dry brains are tenacious of fixed impressions. (Like Gerontion, they are in a dry season, waiting for rain.) Saturn and winter and the north wind foster "windy" melancholy, which may be humored by warmth and moisture. Black hellebore is remedial. The dietaries offer helpful suggestions.

The Elizabethans had a psychology of melancholy as well as a physiology. Mr. Babb has not chosen clearly to separate these lines, perhaps because, as we shall see, the psychological line is so confused with the physical. We might describe their psychological melancholy as moving somewhat like this. Both reason and imagination initiate the passions. Improper and unhealthy initiations may be expected in enthusiasts, lovers, scholars ("dizzards"), etc. Directly, the passions dry the body, while indirectly they stimulate the vital spirits (produced by the heart) which, in turn, moving through the body, act upon bodily organs. The spleen, thus disturbed in its function, becomes overheated, emits melancholy and/or (this is confused) fails to absorb and excrete melancholy. Vapors, rising from the spleen as from a marsh, may cloud the screen. The vital spirits have a central rôle in the psychology of melancholy, for they, themselves depraved, would seem to vitiate mental images, giving them a darkness. "Visual impressions are tinctured by the blackened spirit and appear as blackened images before the common sense and imagination."

The sensory disturbances belonging to melancholy are a matter of great interest. Glass would seem to figure prominently in the melancholy delusions Mr. Babb has catalogued. The tendency of the depressed to see themselves as animals and beasts is sadly substantiated. Manic depression is adumbrated. However, in Mr. Babb's collection of psychological detail one will look in vain, just as one will in the whole of Burton, for anything quite correspondent to contemporaneous descriptions of nervous disorders.

Such was the picture of melancholy in an age whose psychology had its roots in a benighted physiology. Some scholars have gone back to the Elizabethans' psychology to seek an intimation of current concepts in this field. Bergen Evans and George Mohr, for instance, in their study of Burton, have been able, with some effort, to read back into the *Anatomy* Freudian and Marxian attitudes concerning the rôle of environmental factors in the neurosis. Today it is not uncommon for professionals and laymen alike to approach psychology with a disregard for underlying physiological mechanisms. This impresses one as being hardly more enlightened than the physiological thinking behind Elizabethan psychology.

Mr. Babb's second purposes in this study are to consider the numerous types who made their way into Elizabethan literature. He first discusses the malcontent who flourished in Elizabethan drama, but who hardly appeared in Elizabethan psychological literature for the very reason that this fellow was faking a melancholy which the Italians had made rather fashionable. Everybody loves an Elizabethan malcontent—ruffling his silks, poor but superior, reading his Machiavelli, and ready to take a small hand in villainy. Mr. Babb's pages reaffirm our affection.

A more authentic melancholy figure in these times was the man of genius, for whom the malcontent rather hoped he might be mistaken. The Aristotelian association of melancholy and genius was strongly revived in the Renaissance by Ficino, Melanchthon, and many others. England apparently brought broad support to this tradition. The poets Donne, Strode, Vaughan, and Milton spoke for this assumption, while the psychologists maintained that the dry heat of melancholy could light up the brain—"Anima sicca est sapientissima." The Renaissance was generally ascribing melancholy to not unadmirable types, and in no instance was the humane suggestion more pronounced than in the ascription of melancholy to the most talented. The literary critic could find in Mr. Babb's final pages many notes for an "aesthetic of depression." That the creative act begins in dejection has been widely intimated. Even one of Robert Frost's spirit can observe: "A poem begins with a lump in the throat; a homesickness or a love-sickness." The literary historian in reading this section of Mr. Babb's study may be especially interested in such quotation as seems to indicate that the idiom of nature arose in conjunction with talented melancholy.

Mr. Babb's most extensive literary explorations are concerned with the melancholy lover and his appearance in the drama of the Elizabethans. First, he shows how widely psychological writing promoted the concept that the erotic disposition was liable to physical melancholy and its manifestations. This physical condition might be induced by a multitude of causes: loss of semen (itself the essence of blood's good humor), unevacuated semen, drying by love's heat, insomnia, bad digestion, the shock of love's first sight, etc. As he moves from this psychological literature into the drama of the Elizabethans, Mr. Babb takes with him the thesis that the lover of this drama was generally represented as pathological. However, he makes it clear that Shakespeare did not accept this view. "Amid general belief in the lover's malady, one discovers a genial skeptic." This is an important admission and we think it might well be enlarged into a theme. Is this not exactly what literature at its best did, namely, correct the misconceptions of a science, thus saving the whole human being for a better day? The correction in the erotic area was extensive. In the great love poetry of Donne and Spenser, the approach to the lover is so strong and whole as to disallow even the shadows of pathology. With Donne especially love is in very good health, eating and sleeping well, and getting along without arms akimbo or hats awry. So far from being a madness, it is a theme for

reason. If Mr. Babb is promoting the thesis that literature and psychology fused in the Elizabethan period, we must express some measure of disagreement with him. While the psychological description was obviously being used, at the same time the best Elizabethan literature was modifying and deepening this limited science. Psychological literature was clearly nothing to show as an equivalent for Shakespeare's treatment of profound melancholy and mental distraction. That understanding of madness in terms of its growth within a family circle, which we see in *Hamlet* and in *Lear,* would appear to be quite unintimated in the psychological literature which was available to Shakespeare. Ford would seem to be the best friend of Mr. Babb's latent assumptions, but Ford too goes way beyond the psychological texts when he describes mental illness in all its wistfulness and odd grace.

We wish Mr. Babb had given credit to the corrective and indeed redeeming function which Elizabethan literature served in its association with a science in which the physiological slant was at once so illuminating and so restrictive. At the same time be it said that there are values enough in this study which, with descriptions so useful, calls attention to the physiological emphasis of Elizabethan psychology. This is matter worthy of memory, and one person who realized this was the doctor-poet John Keats. Keats was trained (by himself) in the new philosophy of the association of ideas, which was motivating, as it still does, an enlightened and quite un-Elizabethan psychology. In his remarkable *Ode on Melancholy* we see Keats interpreting depression in the rising language of association. Nonetheless, the first stanza of his ode seems to stand as a subtle and loving symbol of that dark, physiological melancholy of the Elizabethans which Keats had absorbed from his Burton and would not forget.

Toronto, Canada KENNETH MACLEAN
New Haven, Connecticut PAUL D. MACLEAN

Sir ARTHUR KEITH. *Menders of the Maimed. The Anatomical & Physiological Principles Underlying the Treatment of Injuries to Muscles, Nerves, Bones, & Joints.* Philadelphia, J. B. Lippincott Co. [1952]. (Limited edition by offset for distribution in the United States. Original edition, London, 1919.) xii + 335 pp. $10.00.

IN the English-speaking world John Hunter more than anyone else joined the study of natural history with the art of medical practice. He was the ardent advocate of the view that the surgeon should understand the recuperative and adaptive capacities of the tissues of the body in order to assist their expression in healing and restoration of function. But there are others in England and abroad who, from positions of less prominence, sought through the years to assist nature in her efforts to restore function in bone, in muscle, joint, and nerve. Some found her aided by rest, others, observing different circumstances, believed action and movement to be the best allies of healing. The lives of these men and their contributions to medicine

were cleverly interwoven in a series of lectures on "The Anatomical and Physiological Principles Underlying the Treatment of Injuries to Muscles, Nerves, Bones and Joints" given at the Royal College of Surgeons in the winter of 1917-18 by the Conservator and Hunterian Professor, Sir Arthur Keith. With these lectures Keith hoped to stimulate a generation of British surgeons faced with the rehabilitation of the casualties of the First World War to approach their task in the Hunterian tradition and to acquaint them with their antecedents. These lectures appeared a year later under the title *Menders of the Maimed*—a book that transcends the purpose of the lectures and the time of their preparation, for the views and accomplishments of the men of whom Keith writes will continue to interest and educate each new generation of natural historians, biologists, and men of medicine. Here, too, is a rare combination of biography and history of scientific thought with the natural history of medical practice. A host of educators will welcome the appearance of this new, though limited, printing of an old favorite and its availability to their students.

New Haven, Connecticut DONALD H. BARRON

EDWARD M. BROCKBANK. *John Ferriar: Public Health Work, Tristram Shandy, Other Essays and Verses. William Osler: His Interest in Ferriar. Biographical Notes.* London, Wm. Heinemann, 1950. 51 + 3 pp., frontispiece, portrait (of Ferriar), facsimile letter (of Osler). 6*s*.

THIS is a pleasant and handsome booklet, with its contents set out in something like Elizabethan profusion on the title-page and its nature well described in the dedication to Osler as "An affectionate tribute." Ferriar (1761-1815), as Osler wrote in the letter here produced, "was far in advance of his day and generation." Even his literary contributions would justify this opinion. Did he not help to revive interest in Osler's second favorite book, the *Anatomy of Melancholy,* and show how extensively another favorite, *Tristram Shandy,* was borrowed from it? And was he not the first to describe as "bibliomania" Osler's own pet disease? As for his professional service, he was a real pioneer in public health, establishing the first board of health in England (1796) and the first "House of Recovery," an euphemistic term for the dreaded fever hospital. Typhus was then a necessary concomitant for poverty, but it was not to be allowed to endanger the better classes. Ferriar knew the remedy and used the consequences of failure to improve conditions as a threat in his fairly successful agitation for adequate housing and the humane treatment of children. He was not the least among the brilliant followers of Priestley who made Manchester in those days the progressive centre of England.

The Oslerian appendage consists of "personal and other notes" about Osler's visits to Manchester. They include a truer and pleasanter version than the one recently published of his encounter with the "Saintly and Sab-

bath-keeping" Infirmary interns; but the notorious Weir Mitchell cherry-pie test should not be transferred from Philadelphia to Baltimore!

Readers of this, as of Dr. Brockbank's more extensive studies of the medical history of Manchester, will hope that, despite his four-score and more years, it is not his swan song.

Montreal, Canada W. W. FRANCIS

HENRY M. PACHTER. *Paracelsus. Magic into Science.* New York, Henry Schuman, 1951. x + 360 pp. $4.00.

ONE of the most fascinating, contradictory and elusive figures of the Renaissance was the physician, surgeon, and scientist, Theophrastus von Hohenheim, better known as Paracelsus. Since his death, he has claimed the attention of historians, physicians, poets, novelists, and members of various esoteric sects. Many have seen him as a colossal humbug, others as a great forerunner of modern medical science. Despite this interest, however, a satisfactory biography of Paracelsus in English has long been needed. This need has now been satisfied by Pachter's excellent book.

Recognizing that Paracelsus in amny ways embodied the characteristics and contradictions of the age of the Renaissance and Reformation, Dr. Pachter has endeavored to give us a picture of the man in the round and to place him in the context of his own time and place. Thus he deals not only with Paracelsus the physician and scientist, but equally with Paracelsus the magician, the theologian, and the social philosopher. It is only in these terms that one can hope to grasp the full significance of the great Swiss.

Furthermore, in judging the historical position of Paracelsus, one must consider his influence on the non-medical areas in which he was active equally with his medical ideas and activities. Dr. Pachter, for instance, emphasizes the biological and medical significance of Paracelsus, which is, of course, primary. At the same time, it is significant that Paracelsus and his ideas had a definite rôle in the development of mercantilist ideas in Germany and Austria, specifically through J. J. Becher and W. von Schroder. This aspect seems to have escaped the author of this otherwise excellent book.

In dealing with a period as multiform as the Renaissansce and a character as elusive as that of Paracelsus, it would be difficult indeed to satisfy everyone. As a result it is not at all surprising to find Dr. Pachter expressing opinions to which one must take exception. For instance, on page 55, he offers a very derogatory opinion of the empirical practitioners of the period. Yet one cannot overlook the fact that some of these were definitely skilled specialists, especially some of the cataract couchers and the cutters for the stone. Likewise, on page 179 he speaks of the mercury treatment of syphilis as futile. Undoubtedly, this is an extreme opinion. Mercury is a spirochetocide, and while it may have been misued, there were cures due to mercurial therapy. Then on page 217, the author indicates as an achieve-

ment of Paracelsus that he did away with "the mechanical model of organic processes, to account for the dynamics of the living cell." In the opinion of the reviewer, the author has here fallen into the trap of associating Paracelsian thought with a concept of later origin, of which Paracelsus actually had no idea, namely, the cell theory. As a last instance, we may point out that the statement on page 277 indicating that phrenology is mentioned in the *Sagacious Philosophy* is incorrect. Phrenology was first created by Franz Josef Gall at the end of the eighteenth century. Aside from these few blemishes, however, this is the best biography of Paracelsus which has appeared in English. It is well and interestingly written and brings to life the fascinating and exciting personality of Paracelsus, who became the model for Dr. Faustus of legend and literature.

New York, New York GEORGE ROSEN

Fifty Years of Medicine: A symposium from the British Medical Journal. London, British Medical Association, 1950. viii + 330 pp., illus. 15/.

THE articles in this symposium first appeared in the *British Medical Journal* of 7 January 1950. Contributed by some of Great Britain's most distinguished investigators, they cover the fifty years between 1 January 1900, and 31 December 1949. Their presentation in the more permanent form of a book provides an important and readable addition to medical history of this period.

In a short preface to the volume, Dr. Hugh Clegg, editor of the *Journal*, states that the record is incomplete. And in the opening chapter it is further stated that "to tell the whole tale of medicine since 1900 in one small volume is obviously impossible. Much has been omitted. Inevitably more attention has been paid to what has happened here in Britain than in other countries."

Of the nineteen chapters making up the volume, eighteen have been supplied by individual contributors. The first chapter is composed of the leading articles which appeared in the *Journal* as the work of a group of writers. These outline some of the most important advances in certain fields of medicine during the past half century such as pathology, public health, psychiatry, medical statistics, ophthalmology, otolaryngology, and anesthesia.

Excellent surveys of fifty years' progress in other specialized branches of medicine are contained in a series of eleven articles, several of which, including Sir Henry Dale's "Advances in Medicinal Therapeutics," and Sir Geoffrey Jefferson's "Surgery 1900-1950," might well be extended to book length.

That this review of fifty years might be seen in perspective, Professor Charles Singer has contributed a masterly essay tracing the development of medical ideas from 1850 to 1900. He believes that the year 1900 "marks as definite a period as can be found anywhere in the vast annals of medical history." In his survey of the eventful half century preceding this date he

has excluded all names from his narrative as best serving his purpose, "movements are greater than men," but he has indicated significant trends and developments leading to epoch-making discoveries with so much clarity that the reader, as he implies, will have no difficulty in supplying for himself the names of Virchow, Claude Bernard, Pasteur, Koch, Freud, Sherrington, Pavlov, Ramón y Cajal, Ehrlich—to mention but a few.

An interesting group of "retrospective" papers goes far to recreate the medical scene of the early 1900's, when it was possible for the doctor, whatever his branch of work, to be more of an individualist than today, and the frock coat and silk hat of the distinguished practitioner were *de rigeur*.

W. J. Bishop gives an informative account of the development of transport and communications during the half century, and the early application of such inventions as the telephone to medicine. (Perhaps it may here be recalled that the Directory of Nurses established at the Boston Medical Library in November, 1879, and credited with being the first organization of its kind, later copied by many libraries, was responsible for the installation at the Library of one of the early telephones of Boston.)

The book closes with a brief but comprehensive review of fifty years of the British Medical Association.

The reproduction of the title-page of outstanding articles, the use of an investigator's original laboratory notes, pictures of operations early in the century, and other excellent illustrations add much to the interest and historical value of this volume.

Cambridge, Massachusetts CHARLOTTE FORD

HARVEY GRAHAM. *Eternal Eve. The History of Gynaecology & Obstetrics.* New York, Doubleday & Co., 1951. xx + 699 pp., illus. $10.00.

HARVEY Graham is the pseudonym of an eminent British surgeon who has previously written *The Story of Surgery*. In *Eternal Eve* he has told the story of gynecology and obstetrics. The author states that the reader should be "an ordinary man or woman, a group that includes doctors and medical students, for this is essentially a story book." The appeal of a specialized book of this kind to the lay reader or even the ordinary professional reader is open to question.

The author states that he has tried to present "a little known fragment of history." Much of his material, however, has long been familiar to historians and specialists, while the general reader has had available such popular books as *Priests of Lucina* by Palmer Findley, *Behind the Doctor* by Logan Clendening, and *Safe Deliverance* by Frederick Irving.

The absence of footnotes is unfortunate since whole paragraphs appear in quotation marks in the text. The bibliographical material is scant, for only thirty-nine sources are listed although some sources are mentioned in detail in the text. The author cannot resist including a good story even though irrelevant, and as a result much extraneous matter is included. A

whole chapter is devoted to the discovery of X-ray and radium rather than its application to the specialties which are the subject of the book.

Nevertheless, *Eternal Eve* is a worthwhile book with many interesting features. It bears evidence of considerable research and contains material not easily found elsewhere. It is written in a pleasing style. In a final chapter called "Twentieth Century" we find an excellent summary of present-day maternity care and how it can be improved. The book contains twenty plates and an equal number of figures in the text, all of which are very well selected.

New York, New York CLAUDE HEATON

JOSÉ LÓPEZ SÁNCHEZ. *Vida y Obra del Sabio Haberno Dr. Tomás Romay Chacón.* La Habana, Editorial Librería Selecta, 1950. 420 pp.

READERS of the *Journal* are aware of the interest and study which Dr. López Sánchez has devoted to the great Cuban physician, Tomás Romay (1764-1849). His paper on Romay and yellow fever appear in the *Journal,* and his earlier essay was reviewed here. Now we have the final fruit of his researches, this elaborate biography of Romay. Born in La Habana, Romay spent his life in his native city and died there of cancer. He is best known for his work in public health, especially the introduction of vaccination against smallpox. Romay was also active in fighting yellow fever and cholera. But he was more than a physician. Romay was also a medical educator, a poet, publicist and politician, and with all these activities Dr. López Sánchez deals in detail. There is no doubt that Romay exerted a profound and beneficial influence on Cuban life. A series of appendices contains documents relative to Romay's life and activities. In addition, the author has compiled a bibliography of Romay's writings from 1792 to 1846, as part of a larger bibliography of his life and work. Unfortunately, there is no index. The author is to be congratulated on a first-rate contribution to the history of medicine in general and Cuba in particular.

New York, New York GEORGE ROSEN

Three Vesalian Essays to Accompany the Icones Anatomicae of 1934. By the late SAMUEL W. LAMBERT, WILLY WIEGAND, and WILLIAM M. IVINS, JR. New York, The Macmillan Company, 1952. (The History of Medicine Series issued under the auspices of the Library of the New York Academy of Medicine). xi + 128 pp., illus. $6.00.

A FOREWORD by Archibald Malloch, formerly librarian of the New York Academy of Medicine, explains that these three essays were originally planned by the late Samuel W. Lambert as a means of dealing with all sorts of Vesalian problems but that their publication was delayed by war and other circumstances. The volume as it now appears deals with three subjects.

Dr. Lambert's essay is concerned with the significance of the initial letters in the *Fabrica.* Dr. Wiegand's "Marginal notes by the printer of the *Icones*" is an address given in New York in 1936 at which time he told about the recovery of the original wood blocks for the illustrations of the *Fabrica,* gave a description of them, and such light as their recovery has thrown upon the production of those illustrations. These two pleasant essays fill only a third of the volume; and the remainder of it is comprised of Mr. Ivins' essay "What about the 'Fabrica' of Vesalius?" Mr. Ivins is convinced that the motivating force in the composition of the *Fabrica,* which has usually been attributed to Andreas Vesalius, was in reality a Flemish artist from Calcar whom he calls John Stephen, who at the time was living in Venice as a student of Titian. Mr. Ivins is notably determined to prove his point, but regrettably he also appears unconcerned about distortion of evidence, being ungenerous to scholars living and dead with whom he disagrees, and on occasion downright insulting. He employs, for example, the following technique. On p. 56 he quotes from Charles Singer's *Evolution of Anatomy*: "The chief defect of Estienne is the distorted ugliness of his figures. These hideous illustrations are, however, the earliest, except those of Leonardo, in which whole systems, venous, arterial, or nervous are shown. . . . The book is one of our best sources for estimating the state of Anatomy immediately preceding Vesalius." On the basis of this quotation Mr. Ivins remarks: "From this it would seem to an outsider that perhaps aesthetics played a larger part in 'science' than is usually thought." Thus he has transferred Dr. Singer's twentieth century opinion to the sixteenth which, of course, was not Dr. Singer's purpose at all. There is a further quotation from the same work (p. 102) that Estienne "was the first to remark upon the valves in the veins, though of their function he had no inkling"; this, Mr. Ivins expands to mean "Estienne had recourse to dissection and made discoveries that way." Here he is preparing the ground for later statements in which Vesalius will be considered as building upon the work of Estienne, as having less anatomical experience and having begun dissection later—in short an inferior anatomist. Now if we go back to the first of these quotations, Mr. Ivins states it is from page 100. This is true for the part preceding the four dots, but the portion after that is on page 102. This is certainly an exceptionally long hiatus to be indicated in this way, and if we read the intervening pages we find that Dr. Singer has made these remarks about Estienne: "The text is largely dependent on Galen." "He claims to have seen with his own eye all he describes. For this, however, he must have used the eye of faith, for he describes structures found in the text of Galen, but not in the human body." "He gives an extremely bad and very Galenic figure and description of the vascular system." These are not all of Dr. Singer's statements, but ones which would certainly have done harm to Mr. Ivins' case.

Mr. Ivins was formerly curator of prints at the Metropolitan Museum of Art in New York and, in his own words, has "forgotten my little school

Latin and am completely ignorant of anatomy." On page 110, he objects to the statement of one scholar because he is "hardly a qualified person in matters of connoisseurship. . . ." Yet ignorant of Latin and anatomy by his own confession, he presumes to remark (p. 46): "It may be doubted if anyone ever wrote a more prolix or less clear style than Vesalius, or one from which it was more difficult to extract a precise meaning"; and speaking of the letter of instructions sent by Vesalius to Oporinus and printed in the *Fabrica* (p. 75-6): "I have no doubt that the fault is that of Vesalius and his vocabulary, but it is obvious that the translators have not succeeded in making sense (even if they made English) of the technical instructions. They might be interesting if any one knew what they meant, but lacking that knowledge it is best to ignore them." Thus, if the evidence appears difficult to understand, discard it! Actually these instructions are not difficult to read and are quite clear in meaning. In regard to anatomy, Mr. Ivins speaks (p. 77-8) of "one delightful example" of Vesalius' Galenical inexpertness which prevented him "from properly classifying some plain and obvious things which he used every day of his life," a reference to Vesalius' enumeration of "four metacarpal bones and 15 phalangeal bones" in the hand. Mr. Ivins is apparently unaware that recent morphologists have come to agree with the Vesalian description.

The chief sources of information used are Roth's biography of Vesalius and Charles Singer's various writings which are nevertheless regarded with considerable suspicion as works of hero-worship with a bias toward Vesalius. As it turns out, the major bias recognizable is that of Mr. Ivins against Vesalius and anyone who dares to say anything complimentary about him. In one instance (p. 70) Mr. Ivins goes so far in his efforts to belittle Roth as to give a ludicrously literal translation of one of his sentences from German into English, remarking: "Le style, c'est l'homme même." Mark Twain did this sort of thing much better. Dr. Singer comes in for an almost continual—and, needless to say, unjust—belaboring, being accused of ignorance, blind partisanship, and (p. 69) implied dishonesty in scholarship. Doctors Cushing, Fulton, Saunders, and the present reviewer seem to be nothing worse than incompetents. Sherrington, several times referred to because of his work on Fernel, comes off unscathed since some of his remarks could be used as ammunition by Mr. Ivins. The late Paul Kristeller is an authority whose views are to be accepted when they can be used against Dr. Singer (p. 66), and opposed when they conflict with the views of Mr. Ivins (p. 88). Indeed, those that are most berated, such as Roth and Singer, are occasionally useful when one can be cited against the other; naturally if this is done frequently enough, both will be annihilated and Mr. Ivins will have won the field. In some instances, quotations from Dr. Singer's writings have been mishandled and thereby give false support to Mr. Ivins' case. One has been mentioned above, and others are to be found on page 57 (Prelude, p. xxxvi), page 59 (Philosophic Background, p. 77), while on page 68 (Prelude, p. 2) Mr. Ivins attempts to make a general statement about Vesalius

apply to a specific instance. Just how it happened that Vesalius, now dead for almost four hundred years, came to arouse such bitter animosity in Mr. Ivins is never explained.

The attack against Vesalius is mounted virtually from his birth, but the heavy blows are not unleashed until he has reached Padua in 1537 and obtained his degree there. Thereafter, Vesalius became not professor of surgery, but some sort of tutor with the right to give a private course in anatomy. Prior to October 1539 he was put on the university payroll but with what academic rank is unknown, and the last renewal of his contract with the university was in 1542. Upon his arrival in Padua, Vesalius was largely ignorant of human anatomy, but to make up for this he had the following qualities: ambition, jealousy of others, unflagging exhibitionism, shameless boastfulness, a torrential and incomprehensible vocabulary, and a most insensitive attitude toward the truth. It is not customary to say these things, but since Vesalian orthodoxy has kept them hidden, Mr. Ivins feels that it is his duty to expose them. Of course, he has been combing the works of Roth and Dr. Singer to find them, so such matters cannot have been very well hidden. But that matters little now that Vesalius is such a despicable character. "As a witness, and to a curious extent he is the only witness there is, his testimony about his own accomplishment is not to be trusted." Hence, so far as Mr. Ivins is concerned, anything that Vesalius says in his own defense is not to be believed.

In 1538 the *Tabulae sex* was published. The privilege to print is in the name of Vesalius, but the colophon mentions that the cost of the plates was assumed by John Stephen of Calcar. Thereupon Mr. Ivins implies that the motivating force in the publication was John Stephen. He seems unaware that there exists a variant of the final plate without this statement, and while it may be merely a proof-sheet, yet on the other hand it may be that the plates were published originally by Vesalius for his students, that the privilege to print was both a protection and an identification, and that in lieu of a fee the artist was given the privilege of selling a portion of the edition in his own name. Certainly, Vesalius' story is straightforward: that publication was made necessary because of piracies which we know did take place. It is also Vesalius who remarks in the *Tabulae* that the three skeletal drawings are by John Stephen, and for once Mr. Ivins is willing to accept his word. But where Vesalius remarks that the first three plates were the product of his own draughtsmanship, Mr. Ivins speaks of this as an "ambiguous passage in the text" and proceeds to call them "very clumsy child's play." This final remark appears to result from the fact that Dr. Singer considers these plates to "reveal Vesalius . . . as a very competent biological draughtsman." The significance of the adjective "biological" is apparently not comprehended.

The *Venesection Letter* of 1539, according to Mr. Ivins, is "a very youthful and bombastic parade of bookish learning, incredibly verbose. . . . Moreover it is as clear as mud. . . ." Elsewhere he writes that "Much has been

made of the notion that this little book is Vesalius' first trial peep on the mighty trumpet with which later he was to bring down the walls of the Galenical Jericho." Mr. Ivins' "Much" can only refer to a statement to be found in the introduction to the English translation: "Here Vesalius asks a first tentative question 'whether the method of an anatomy could corroborate speculation';. . . . The venesection letter is therefore transitional, occupying the period of his scientific adolescence. . . ." It is, however, revealing to note another statement of Mr. Ivins in regard to this work. He quotes from the introduction: "With the publication . . . and further Vesalian studies preoccupation [with the venous system] had become greatly intensified. . . . [anatomical works after the middle of the sixteenth century contain] disproportionate treatment of the venous system—a complete reversal from what obtains in the modern textbook. . . ." Mr. Ivins replies: "Put plainly, this means that Vesalian doctrine and influence, far from setting medicine on the right track, hindered it from finding its way out of the Galenical morass." Even though he confesses himself ignorant of anatomy, Mr. Ivins ought to know better than this, especially since he goes to such pains to state that Vesalius had no part in the work leading up to the discovery of the circulation of the blood. Moreover, he has overlooked the fact that it is in this little work that Vesalius is the first to note that cardiac systole is synchronous with arterial expansion and, as such, an attack on Galenical dogma.

But to continue with Mr. Ivins' original biography of Vesalius, we next note the editorial work on several Galenical texts for the Giunta edition of 1541-42. On the basis of the works which have been mentioned, Vesalius is a Galenist. How, then, did he manage between *circa* 1539 and August 1542 to compose a work of such magnitude as the *Fabrica,* especially when he was a young man without much experience as an anatomist and a Galenist as well? Here Mr. Ivins' unexplained animosity toward Vesalius leads him to perform the remarkable feat of dashing off in several directions virtually at the same time. He has already doubted Vesalius' ability to write the text of the *Fabrica.* Then he doubts the value of it, partly, at least, because it contains nothing spectacular enough to be comprehended by a man ignorant of anatomy; without expressing it in so many words, Mr. Ivins appears to feel that Vesalius failed by not discovering the circulation of the blood. Thereafter, the text is not important anyway since the real importance is to be found in the illustrations. The "musclemen" in particular indicate an artist (John Stephen) of great ability in anatomy since, especially in the case of those figures in living poses, no artist who could produce such drawings could do so from the directions of an anatomist. Finally, the artist made the drawings and employed an anatomist-hack (Vesalius) to write a commentary. There is no explanation as to why a commentary of such length was required, and in view of one of Mr. Ivins' numerous positions that the text is Galenical and insignificant, why did not the artist demand something better for his money or improve it himself?

Later this fellow Vesalius, a malicious, envious, and thoroughly unlikable braggart, left Padua to procure "a secondary position among the physicians to the Emperor." In 1546 he wrote the *China Root Letter,* "an autobiography and ill-tempered apologia, in which Vesalius . . . casts aspersions on his teachers and contemporaries . . . tells of his misunderstanding with his artists (who are not named), calls Realdo Colombo, . . . a pretty assortment of names, and says that he had never seen an Italian do a dissection." And to conclude this account, in 1564 there was published his reply to the *Anatomical Observations* of Fallopius which "is extremely interesting for two things in particular, one that Vesalius allowed no merit to many of Fallopius' very important and most original observations and did not bother to control them by examining a cadaver, and two, that in rejecting them he held to the old erroneous and Galenical teaching."

A reviewer cannot hope to deal adequately with all Mr. Ivins' errors, splenetic and otherwise, without writing a full-scale essay of rebuttal, and the task is made further difficult by the fact that he seems unaware of the scholar's right to alter his opinions with the passage of time, the accumulation of more knowledge, and further reflection, and he does not hesitate to confront a study made by Dr. Singer in 1946 with one written twenty-one years earlier or, indeed, with Roth's biography published in 1892. Moreover, to Mr. Ivins' and perhaps because of his years as curator of prints, everything is black and white. Despite his cry of hero-worship of Vesalius, he appears to believe that if Vesalius is not a hero he must be a villain, and, of course, since Vesalius is the villain, the vacant hero's throne must immediately be filled by John Stephen. Perhaps the most flagrant example is one which concerns a relatively minor point insofar as the major attack is concerned, but one which is indicative of the state of mind and preconceptions with which Mr. Ivins has undertaken his task. This is his remark that Vesalius after leaving Padua procured "a secondary position among the physicians of the Emperor." There is not a shred of evidence to support this view of a "secondary position," while on the other hand there is a wealth of evidence to prove that Vesalius was the favorite medical attendant of the Emperor and that when he went to Spain as medical attendant to Philip II, he held similar high favor with that monarch, that he was sought after for his special opinion wherever he was, both by the laity and the medical profession. Much of the evidence for this is available in languages which Mr. Ivins' notes suggest that he can read. Finally, the very fact that Dr. Singer has tried to give a tempered, scholarly appraisal of the place of Vesalius in the history of anatomy causes Mr. Ivins to attack him with unwarranted ferocity presumably on the theory that Dr. Singer's admission of any failure in Vesalius must be the admission of total failure.

When we come to a consideration of the *Fabrica,* we are faced immediately by the problem of Mr. Ivins' ignorance of Latin and anatomy, and arising out of the latter is the further unfortunate fact that he has no appreciation of Galen or his position in the sixteenth century. Now, Vesalius

was and remained a supporter of Galen, but who was not at the time? In 1628, Harvey, whom Mr. Ivins seems to admire, was still citing him and calling him the "Prince of Physicians," and even today we admit his merits. Thus, to condemn Vesalius by calling him a Galenist is nonsense. The important question is whether or not Vesalius was a blind adherent to Galen like his former teacher Sylvius. Here the answer is negative, and thereby one of the reasons for the greatness of the *Fabrica*, which, by the way, is not nearly so difficult to read as Mr. Ivins would have us believe. The *Fabrica* represents a very substantial effort to give a complete description of human anatomy based upon human dissection and observation. In addition, the Galenical description is given, and the discrepancies between it and that based upon human dissection pointed out. On occasion Galen's views are correct, frequently they are shown to be incorrect. From time to time Vesalius is in error and sometimes he accepts Galen's error. A work of such magnitude, and a pioneering work as well, naturally contained mistakes, and moreover, dissection material was not always very plentiful. Mistakes were to be expected, and such errors as were remarked, and as Vesalius had the opportunity for further observational anatomy, were rectified in the second edition as any comparison of the two texts will indicate. Indeed, it is to the great credit of Vesalius that he did not accept blindly all the proposed rectifications that were offered to him but only as he had time and opportunity to test. In 1561 Gabriel Fallopius published his *Anatomical Observations*, a running commentary on the *Fabrica* in which Vesalius' errors and omissions are indicated, and it is noteworthy that on more than one occasion Fallopius calls attention to errors or omissions which actually are not present. Yet the spirit between the two men was of the friendliest, witness Vesalius' reply in his *Examen* and his complete willingness to agree to error when it had been proved to him and in the same way to receive what he had previously overlooked. It is true that once enraged by the virtual piracy and, worse yet, the misuse of his illustrations by Valverde, he unjustly remarks that Valverde had never dissected. At any rate, these things which have been said about the *Fabrica* are what make it the great book it is and the foundation of modern anatomy—the fact that insofar as it was possible Vesalius scrutinized the entire human structure from the viewpoint of independent, scientific observation based upon human dissection, which in turn meant that thereafter every anatomist who laid claim to any professional reputation must treat his subject in the same way. This does not mean that no one had used this scientific method before. Already it had been employed by Achillini, by Berengario, and by Massa—to name three earlier anatomists of the sixteenth century. However, their use was occasionally timid, certainly fitful, with uncontested Galenical errors all too frequently manifesting themselves, and not on the grand and all-inclusive scale of the *Fabrica*. Fallopius compares Berengario with Vesalius by saying of the former that "he was the first to restore the anatomical art which Vesalius later perfected," while elsewhere he refers to the *Fabrica* as Vesa-

lius' "divine monument." Furthemore, none of these earlier anatomists had the magnificent plan of presentation which was to appear with the *Fabrica* or that modern compulsive sense of the obligations of scholarship which was the cause of the thorough and all-inclusive nature of the presentation and which also led Vesalius to follow his evidence even though it might mean the end of a friendship and shrill attack upon him. This somehow has come to be interpreted in recent times as an indication of Vesalius' quarrelsome nature.

That Vesalius had broken away from blind, partisan adherence to the leadership of Galen is obvious from his contemporaries He came to the parting of the ways with his erstwhile friend John Caius with whom he had lived for eight months during the composition of the *Fabrica*. Caius was a full-blown Galenist. In his *China Root Letter* Vesalius replies to the hysterical attack of Sylvius, the arch-Galenist of Paris, and replies, let it be said, with great dignity. In respect to the charges that Mr. Ivins makes about Vesalius' unpleasant character and personality, it is interesting to note what Vesalius' contemporary, Jerome Cardan, the physician and celebrated mathematician had to say: "Vesalius, a man of decent restraint, gave proof of his attitude toward malignant controversy, for when he was stirred by Corti to engage in some insignificant dispute, he was unwilling to mention his name." Indeed, it is difficult to find remarks of disapprobation specifically mentioning names in the *Fabrica* despite its size. In the case of Matteo Corti, mentioned in the *Venesection Letter* in friendly terms, after their dispute Vesalius merely ceased to mention him, as a glance at the index of the *Fabrica* will display. Certainly he was entitled to mention the name of Sylvius who had called him a mad man in the very title of his book of vituperative attack, and in this case the defense of Vesalius by Renatus Henerus is indicative of contemporary sixteenth century belief that the attack was outrageous and the defense dignified and restrained. No doubt Vesalius had had exasperating experiences with his artists, but even so he does not mention them by name in his *China Root Letter*. Would that he had, so that we might know definitely who was responsible for the "muscle-men" and the magnificent skeletons in what Dr. Singer so aptly calls their "noble poses." Certainly when Vesalius mentions Valverde by name he is justified since Valverde had cheapened the great illustrations both in reducing them in size and in the method of reproduction. As a matter of fact, Vesalius offered to let anyone use the blocks if only the reproductions would be properly made and kept to full size—quite proper conditions.

Mr. Ivins remarks that the *Fabrica* would not have come into existence without (a) the systematizing work of Guenther of Andernach and Sylvius, (b) the idea of a complete pictorial account of the body, e.g., Estienne, (c) dissectors in Italy, e.g., Massa, (d) "accumulated knowledge of the medical profession, much of it going back as far as Galen," (e) "accumulated knowledge and skills of the draughtsmen and block cutters." One might go on and suggest the importance of typesetters, bookbinders, etc., and even

then how does all this help Mr. Ivins' case? Certainly Vesalius built on the work of his predecessors as everyone does, including Mr. Ivins. The important thing is that the *Fabrica* represents the culmination of all these earlier efforts. And therefore when Mr. Ivins remarks that the *Fabrica* could not "have come into existence as the result of the original work that was done on [it] by the young and comparatively ignorant Vesalius in the so short time he devoted to his famous volume," his remark is utterly inane. He is merely creating and destroying a man of straw. Then having dealt this mighty blow, he notes that the *Fabrica* is not a work on physiology. Somehow this is another black eye for Vesalius. Moreover, it is to be criticized because it "was neither the first nor the last anatomy." Not content with this profound criticism he remarks that it is "neither very much better nor very much worse than a number of other books of the period." On page 84 Mr. Ivins ticks off Dr. Singer as being in "ignorance of the techniques and vocabulary of the wood block and of printing" and then, already self-confessed as ignorant of Latin and anatomy, he has the effrontery to pass judgments on both the language and the anatomy of the *Fabrica*. Under these conditions he is in a position to recognize only the most spectacular sort of innovation, and the significance of Vesalius' remarks on the lower jaw and his analysis of motions occurring at the atlanto-occipital and atlanto-epistropheal joints, for example, are apparently completely without meaning for Mr. Ivins. As to the entire responsibility for the production of the book, only one person, Mr. Ivins, has had the temerity to suggest that it was anyone other than Vesalius. On the other hand, a number of Vesalius' contemporaries, foes as well as friends, grant him the honor. On the question of time, it may be said for the present that it was sufficient because of the results obtained, and we know as well, on the testimony of Fallopius, that Books One and Two at the least had been completed by 1541 and were in the process of being set up in type. We also know that some of the drawings had been made relatively early—some of them early enough so that Vesalius in writing the text is able to call attention to the errors in the drawings, and from his use of the singular and plural it appears that some of the smaller drawings are his own work. In some cases the situation was such and the opportunity so unexpected and the need for speed so great that it was impossible to employ an artist. But of course these things can be learned only by reading the Latin text and by putting some faith in what Vesalius says.

As to the illustrations of the *Fabrica*, let us first consider the remarks of Vesalius' contemporaries. John Caius, who lived with Vesalius in Padua, says "When he was writing and illustrating" the *Fabrica*, and when Caius wrote this, he was no longer on friendly terms with Vesalius and had no hesitancy about pointing out what he considered were the faults of his former friend. Vesalius' assistant at Padua was Realdus Columbus, ambitious and not unwilling to criticize Vesalius to the students during his absence from Padua in 1543 when he was seeing to the printing of his book and thereafter serv-

ing as a military surgeon in a short campaign in the Netherlands (this seems to be the absence which Mr. Ivins finds inexplicable). Columbus tells part of this in his *De Re Anatomica* (I, xix): "When Vesalius was absent and detained for a long time in Germany [i.e., Switzerland] in order to attend to the publication of his work *De humani corporis fabrica,* I who was then in Venice to assist with all my help and because of great esteem, the primary surgeon and my preceptor, Joannes Antonius Leonicus, suffering from a serious illness, the whole school of Padua judged me worthy to fill the place of Vesalius and offered me a salary which was not to be scorned." While Columbus is evidently proud of this offer, it must be noted that this pride rests upon two facts: the position which Vesalius held had to be an important one and Vesalius must have had recognition. This latter fact is emphasized by his invitation from the Duke of Tuscany to re-open anatomical studies at Pisa (January 1544 to the beginning of the Lenten season). When he left Pisa, despite further invitation to stay and thereafter when Leonard Fuchs refused to come, Columbus was offered the post as a third choice and at a considerably reduced stipend. He had no tender regard for Vesalius, and if it had been possible for him to deflate the latter, he would have been only too happy to do so, especially since he is reputed to have had a streak of cruelty in his nature which was manifested in the course of his vivisections. Yet he speaks of Vesalius' strenuous efforts to combat Galenism and remarks "as Vesalius depicted graphically (*pinxit*)" in reference to the *Fabrica's* illustrations. A third contemporary witness is Gabriel Fallopius who succeeded to the chair in Padua after Columbus. Where he normally uses the term "describe" with its verbal implications, in one instance in his *Anatomical Observations,* in referring to the *Fabrica* he speaks of certain muscles which Vesalius "delineated," and this delineation can be identified as referring to the seventh and fourteenth "musclemen," thus once again suggesting not that Vesalius actually drew these figures but that he was the motivating force in the production of the illustrations.

Keeping these three witnesses in mind, let us return to Mr. Ivins' suggestion that the *Fabrica* was printed in Basel rather than in Venice because "neither the *Fabrica* nor the *Epitome* mentions the name of John Stephen, who illustrated them, and that in the *China Root* of 1546 Vesalius was to tell how he had quarreled with his artists." However, the men who were on the ground, so to speak, were completely unaware of any such reason. It is far more reasonable to suppose that Basel was chosen since Oporinus was just the man to produce the results that Vesalius wanted—as he did produce them. Nor should it be forgotten that Vesalius had already had books published in Basel by Winter, with whom he was on very friendly terms—he was godfather to Winter's child on 3 August 1543, and Oporinus was the brother-in-law of Winter.

There seems to be little reason to believe otherwise than that the illustrations of the *Fabrica* were made under the direction of Vesalius and, as seems quite possible, in Titian's studio where one of the several artists may very

possibly have been John Stephen, but certainly the skeletal figures of the *Fabrica* were not drawn by the same man who did the skeletal figures of the *Tabulae Sex*. Leaving aside any question of misarticulations of the skeletons as a source of errors in the drawings—as Mr. Ivins suggests, attributable to the anatomist—there are many errors of draughtsmanship which make these figures inferior to those of the *Fabrica*, such as misrepresentation of the clavicles and scapulae, lack of proportion and crudity in the representation of the vertebral column, sacrum, and pelvis. Incidentally, Mr. Ivins could, if he desired, do a considerable service by identifying the existing drawings or paintings of John Stephen since surely were he the great draughtsman that Mr. Ivins believes, we are entitled to believe that his works would have been preserved, at least in part. It is true that there have been some attributions—although on little evidence—but nothing so remarkable as to suggest that he had been responsible for the great figures of the *Fabrica*.

Mr. Ivins' case for John Stephen rests upon four statements. The first two are drawn from Vesalius' writings although it is interesting to recall that he puts no faith in anything Vesalius says. First, is the statement in the *Tabulae Sex* which recognizes the existence of John Stephen, his presence in Venice, and his responsibility for the three skeletons of the *Tabulae*. Next, is a statement in the *Venesection Letter*: "Wherefore, if the opportunity of bodies offers, and Joannes Stephanus, outstanding artist of our age, does not refuse his services, I shall by no means evade that labor." Actually, this gets us no farther along. We do not know if Joannes Stephanus accepted the labor or not, nor can we be sure that Vesalius did not change his mind. We do not know what the alternatives were. The only sixteenth century writer whose words can be interpreted as crediting John Stephen with the drawings in the *Fabrica* is Vasari. Mr. Ivins makes little of the fact that the account of John Stephen is only to be found in the second edition of the *Vite* (1568), but it cannot be denied that Vasari is not always a reliable source and in this case he is telling of something that happended possibly twenty years earlier. Hence, when he speaks of "i disegni dell'Anotomie," it is possible that he is referring to the skeletal figures of the *Tabulae Sex*. Moreover, if Mr. Ivins is able to find an "ambiguous passage" in Vesalius' introductory remarks to those *Tabulae*, as mentioned above, we are certainly entitled to the view that Vasari's phrase in reference to the anatomical drawings of John Stephen, "che fece intagliare," refers to copper plates, particularly when he has already used the word "intagliate" in reference to the Valverdian illustrations which are copper plates. In short, his memory has become hazy on these matters and thus he is not too trustworthy. Mr. Ivins also employs the account of van Mander who, it should be pointed out, was not contemporary with the events, who went to Italy as late as 1573, and seems to rely on Vasari for his information.

There is, however, another source and that much closer to the time of the composition of the *Fabrica*—the *Dicerie* of Annibale Caro, *c.*1543, written by a man who was living with Titian during the year 1540 when work

must have been in progress or at least planned. On the basis of this account we have a much sounder thesis to the effect that the great drawings were made in Titian's studio by assistants employing studies made by Titian which they copied in clearer outline and filled with anatomical detail under Vesalius' instruction. Since Vesalius refers to a plural number of artists it may well have been that among these students was John Stephen whose abilities had not been great enough for him to cope with the task single-handed and without the advice of Titian. This hypothsis, originally put forward, be it noted, by Hans Tietze and E. Tietze-Conrat, trained in what Mr. Ivins calls "connoisseurship," seems not only more plausible and better fitted to the facts, but it tends to discount still more the reliability of Vasari and to make it seem even more likely that his reference is to the *Tabulae Sex*. Finally, it helps to explain the original tradition that the drawings were the work of Titian. But one question remains yet unanswered. Who was the artist who left the stamp of his genius on the great figures of the *Fabrica*?

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An Open Letter to the Editor on "Three Vesalian Essays"

I find that two-thirds of this volume is occupied by an essay by Mr. William M. Ivins, Jr. entitled "What about the Fabrica of Vesalius?" A large part of this consists of criticism of the good faith of yourself, Cushing, O'Malley, Saunders, and myself. Needless to say, I am honoured by inclusion in this company but I feel also that this essay provides an interpretation of the nature of taste and courtesy that none of us would wish to emulate. This is my main reason for doubt as to whether to answer it. Other reasons are the necessary demand on the space of a journal and the time and labour involved.

In my state of doubt I took counsel with that extremely intelligent historian of medicine, King Solomon. I studied his *Proverbs* with some care. On reaching Chapter 26 I was in two minds whether to take the advice that he tenders in verse 4 or that in verse 5. However, as I read further I came on Chapter 27, verse 2. This turned the balance. Why should I seek to justify myself? I was further confirmed when I took a backward glance at Chapter 20, verse 3. So far as the matter concerns myself, silence seems wiser and more dignified. I hope that you and my other colleagues in Vesalian studies will agree.

Nevertheless the *Essay* of Ivins is long, eloquent, readable, typographically impressive, and doubtless will be widely read, though it throws no new light at all on Vesalius, or his book, or his times, and merely repeats, with added and more entertaining emphasis, what Mr. Ivins has already written and said on several previous occasions. Since I can find in it no evidence of further study or research, except on the writings of those criticized, it

seems to me academically wasteful for the few writers who work on Vesalius —all actively engaged in research—to deflect their energies to douching forensic fireworks that seem to have got a little out of hand. The hosepipe should be left in charge of one man. Perhaps the most suitable would be the youngest of the small group of Vesalians.

In any event the matter will remain scientifically exactly where it was, whether Mr. Ivins be answered or no, or whether or not he repeats yet again what he has already written or said so often. All of us will gladly accept his claim to be our master in the art of minute verbal criticism of our own works. We all realise that, as the years go on, and as we learn more, we alter our views and in that sense contradict ourselves. That is the very essence of the scientific method. None of us would dispute Mr. Ivins' claim to be always completely consistent and always saying exactly the same thing. He fully deserves recognition as the most eloquently repetitive contributor to Vesalian literature.

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